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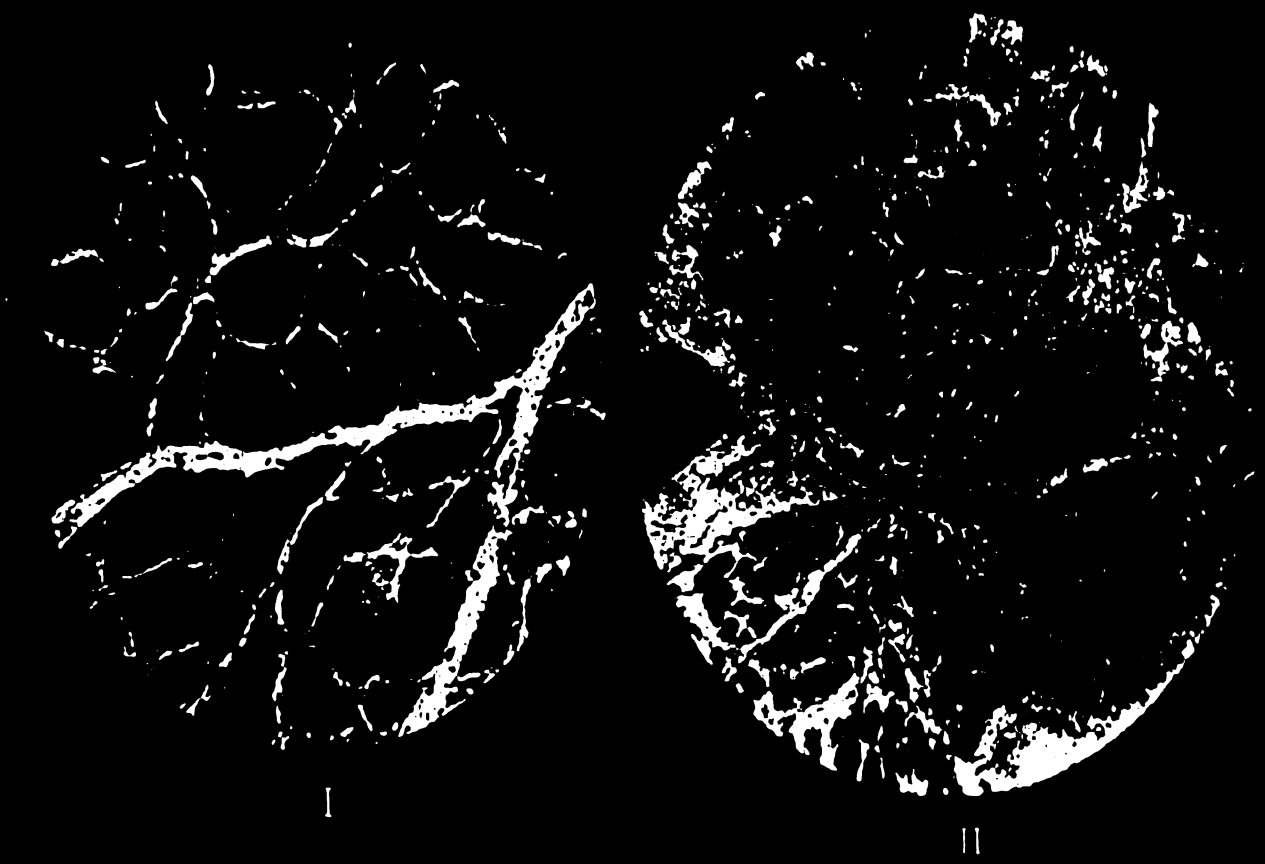

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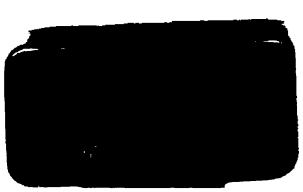

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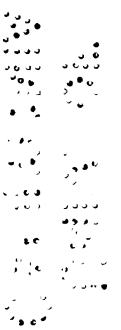

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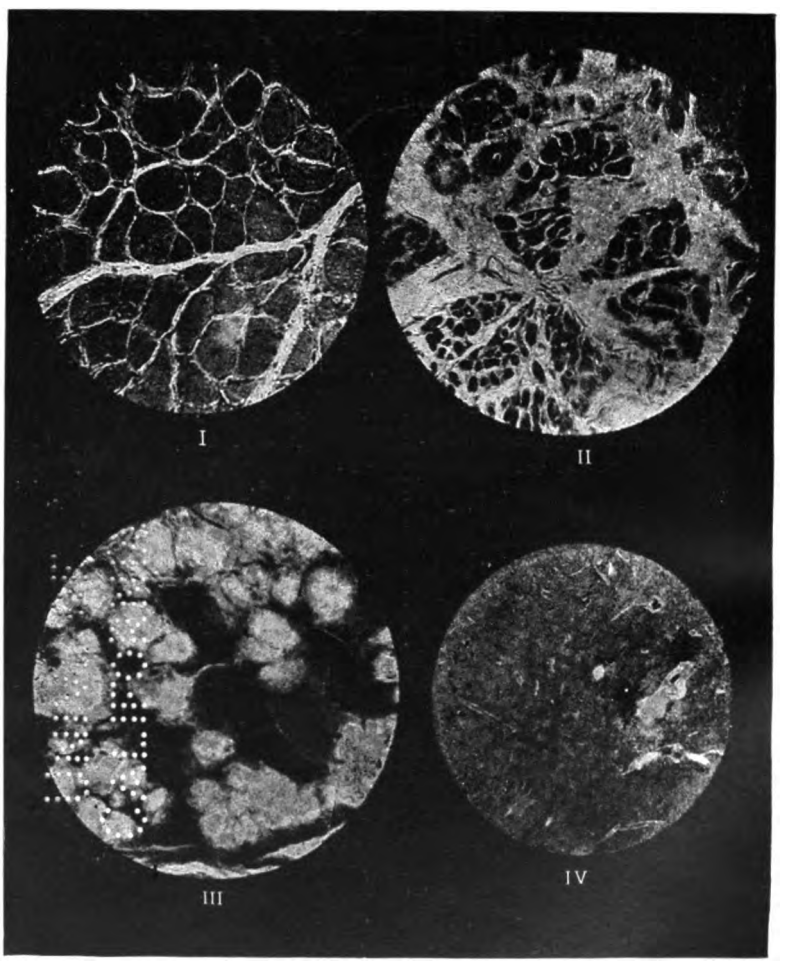

DEGENERATIVE CHANGES IN MUSCLE.

FIG. I.— Cross section of normal muscle. FIG. II.— Simple degenerative atrophy of muscular fiber. FIG. III.— Fatty infiltration and degeneration of muscular fiber. FIG. IV.— Destruction of antero-lateral group of ganglion cells of anterior cornua in grey matter of spinal oord. The ganglion cells to the left (antero-median) are intact, while the antero-lateral have been replaced by cicatricial tissue. (After Wm. C. Krauss.)

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ORIGINAL ARTICLES.

CONTRIBUTION TO THE STUDY OF PROGRESSIVE MUSCULAR ATROPHY.

BY W. H. RILEY, M. D., BATTLE CREEK, MICH.
Member of the American Neurological Association.

(Continued.)

Complications. — The most frequent complication of this disease is bulbar paralysis, a weakness, more or less marked, of the lips, tongue, pharynx, and sometimes the laryngeal muscles are involved. This is an expression of degenerative changes in the motor nuclei of the medulla similar to those which in the spinal cord cause the paralysis of the limbs. In the early stage of the disease there may be neuralgic and rheumatic pains, but these can hardly be considered complications. On account of the diminished respiratory movements of the chest, bronchitis and pneumonia may set in, especially in the latter stages of the disease. Cases have been reported in which there has been marked atrophy of the muscles in the upper extremities, with locomotor ataxia in the legs.

Course. — As the name indicates, the nature of the disease is progressive. The rate of progress will vary in different cases, and at different periods in the same case. Usually the disease makes a good degree of progress in one arm before the second is attacked; and is usually more severe on one side of the body than the other, throughout the course of the disease. Sometimes it begins almost simultaneously on the two sides; in such cases its progress is slower, and is more apt to be arrested at an early date. When there is weakness of the legs without wasting, it usually occurs simultaneously with the wasting in the upper extremities. In some cases the weakness in the legs follows after a longer or a shorter time from the beginning of the disease in the upper extremities.

The uniform progress of the disease may be marked by intervals of apparent cessation, which may last for weeks, months, or even years. Again, there are exacerbations, in which muscles or groups of muscles are almost completely paralyzed in a short time. The average duration of this disease is from three to five years. Sometimes cases run a rapid course, and are at an end in one year; again, the disease may continue ten or twelve years without producing death. One case coming under my observation dated back fourteen years, and when seen by me, the patient was able to perform most of the ordinary movements of health.

Pathological Anatomy. — The pathological changes on post-mortem examination will be found, in the main, limited to (1) the spinal cord, (2) the nerve trunks and peripheral branches, and (3) the muscles.

The wasting of the muscles is even more noticeable than before death. They will be found shrunken, soft, pale in color, and not infrequently streaked with light strips of tissue that indicate the position of complete degeneration. In some instances it is with difficulty that part of the muscle can be distinguished from adjacent fat.

When studied microscopically, the appearance of the muscular fiber will depend on the degree of degeneration that has occurred.

1. There may be simply a narrowing of the muscular fiber without any other changes. Sometimes the striæ are farther apart than normal. Sooner or later there is an increase in the interstitial connective tissue. This usually begins by a hyperplastic growth of connective tissue between and among the primitive fibers,

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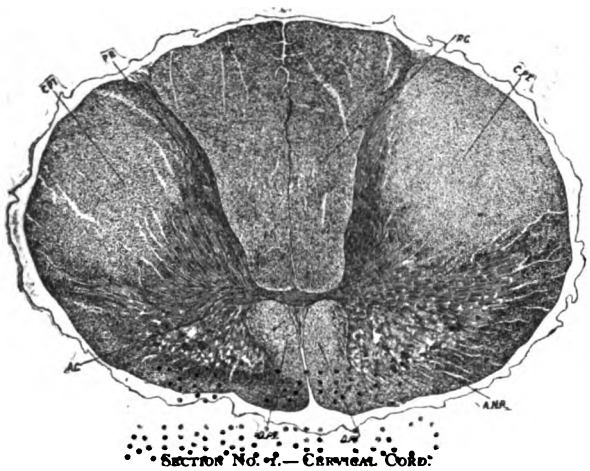
which increases gradually, and soon muscular fiber is replaced by an increased and abnormal growth of connective tissue.



SECTION NO. 1.— CERVICAL CORD.

C. P. T., Crossed pyramidal tracts, showing some degeneration of motor fibers; *D. P. T.*, Direct pyramidal tracts, with slight changes; *A. C.*, Anterior cornua, broken and having a granular appearance, with absence of some motor cells; *A. N. R.*, Anterior nerve root fibers degenerated; *P. C.*, Posterior columns, healthy; *P. R.*, Posterior root, healthy.

(See Fig. II, Frontispiece.) There may appear in the muscular fiber a longitudinal striation, which increases until the muscle has the appearance of a fasciculus of longitudinal connective tissue fibers.

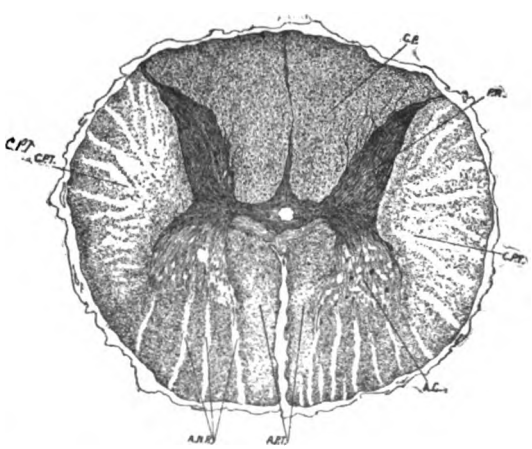
2. Again, there appears within the primitive sheath of the fiber small granules, which take the place of the transverse striæ, flowing together, and increasing in size until they form distinct fatty globules at different points within the sheath of the fiber. In this way the muscular substance is completely degenerated into and replaced by fat. (See Fig. III, Frontispiece.) Occasionally muscular sheaths may be seen which contain a clear, transparent substance, with here and there a transverse stria, and scattered through it a few fatty granules. This transparent substance is probably the result of a process quite different from fatty degeneration; it has been termed "vitreous degeneration."

An entire muscle may be completely destroyed by one or more of the above described processes, while adjacent to it may be muscles which are in no way affected. On the other hand, we may have scattered through a large number of muscles, fibers which are completely degenerated; while in the same fasciculus, and by their side, may be found perfectly healthy fibers. As the disease more frequently begins in the arms and shoulders, the muscles in this part of the body will, as a rule, be more wasted than others.

If sections of the nerve are made and examined, there will be found scattered through the section many degenerated fibers; these will be more numerous in the peripheral branches than in the nerve trunk, and especially those terminal branches which supply the muscles.

If these degenerated fibers are traced upward, they will be found to come only from the anterior spiral roots. In the anterior roots of the cord, the degeneration is even more marked than in the nerve trunk. In the nerve trunk the sensory fibers lying by the side of the motor fibers are not at all affected; but the anterior nerve roots, being made up entirely of motor fibers, are more completely affected.

An examination of the spinal cord shows the affected parts to be softer than normal; the white matter may be grey and translucent. If transverse sections are made, properly hardened and stained, and examined under a microscope, morbid changes will be found in the anterior cornua and in the anterior lateral columns. The anterior cornua do not take the stain as readily as they do in a healthy section, or as readily as the posterior cornua of the same section. The central part of the cornua, particu-



SECTION NO. 2.— DORSAL CORD.

C. P. T., Crossed pyramidal tracts, markedly degenerated; *A. P. T.*, Anterior pyramidal tracts; *A. N. R.*, Showing absence of nerve root fibers; *A. C.*, Anterior cornua. Absence of many motor nerve cells, broken-down, granular appearance; *P. C.*, Posterior columns, having a healthy appearance; *P. R.*, Posterior root, healthy.

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larly, has a broken-down, granular appearance. Many of the large multipolar cells have entirely disappeared; others have lost their processes, and have a shrunken appearance. Sometimes, a group of cells may be entirely destroyed, while others close by are apparently healthy. The nerve fibrillæ disappear with the cells. The interstitial connective tissue increases; the bloodvessels are frequently dilated and surrounded by wide open spaces. There is a distinct degeneration of the anterior root fibers as they pass through the anterior white columns to form the spinal roots. Some of these are entirely gone, others partially. (See A. C. and A. N. R. in Sections 2 and 3.)

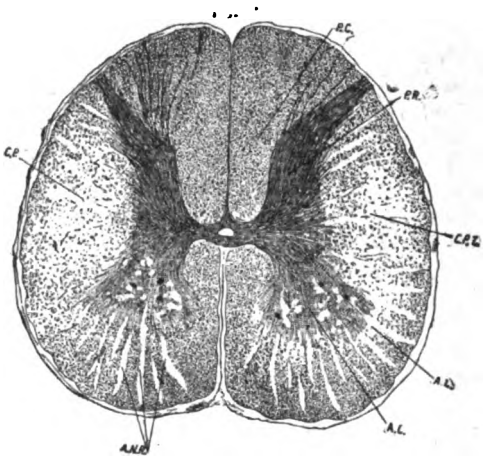
In the pyramidal tracts, changes take place which are quite as distinct as those already mentioned. Both in the direct and the crossed pyramidal tracts, nerve fibers will be found in various stages of degeneration, some slightly affected, others entirely destroyed. (See C. P. T. and A. P. T. in Sections 2 and 3.) With this destruction of nerve tissue there is an increase in the growth of the connective supporting tissue. These two processes, one a failure of nutrition with a more or less complete destruction of nerve tissue, the other an increase in the normal nutritive processes of the supporting connective tissue, go on side by side until a condition of sclerosis is established.

These pathological changes may be more intense in one part of the cord than another. If the wasting and paralysis is more marked in the upper extremity than elsewhere in the body, the pathological changes in the cervical cord will be more intense than in sections lower down.

When the disease first shows itself in the lower limbs, and these are the seat of marked changes, the lumbar region of the cord will be found to have suffered more from the morbid process. The degenerative process may not confine itself definitely to the pyramidal tracts, but may extend out into the so-called mixed zone and affect fibers which probably connect cells at different levels of the cord. Fibers may also be found degenerated in the anterior lateral descending tract. It is important to remember in this connection that none of these tracts have a well-defined border, but that near the outside limits of any particular tract may be found fibers which do not functionally belong to it, and which may not be affected by the morbid changes which characterize the disease.

Degenerative changes in the pyramidal tracts may not be confined to the cord alone, but may extend up through the motor decussation in the medulla, through the pons and crus, into the internal capsule, and in some cases even into the cortex of the brain. If the disease is complicated with bulbar paralysis, the motor nuclei in the medulla will present changes similar to those in the anterior horn of the cord.

The posterior root fibers, the posterior cornua of the gray matter, and the posterior columns of the cord are not affected by the morbid process. (See P. C. and P. R. in Sections 1, 2, and 3.)



SECTION NO. 3.— UPPER LUMBAR REGION.

C. P. T., Crossed pyramidal tracts, degenerated; *A. C.*, Anterior cornua, absence of motor cells and broken-down granular appearance of gray matter; *A. N. R.*, shows absence of anterior nerve root fibers; *P. R.*, Posterior root, healthy; *P. C.*, Posterior columns, healthy.

Pathology. — The oldest pathologist thought the disease was primarily located in the muscle or the sympathetic nerve. These theories need not concern us at the present time, as they are of interest only as a part of the early history of the pathology of this disease.

The constant degenerative changes in the anterior horn of the gray matter of the spinal cord, especially in the multipolar cells and the anterior nerve root, the similar symptoms in acute diseases of the same parts, leave little doubt as to the relation between these pathological changes and the muscular wastings and paralysis so conspicuous during life.

It is a well-established fact that the in-

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tegrity of the motor cell in the anterior cornua of gray matter of the cord, is essential to the healthy nutrition and the proper function of the motor nerve arising from it, and the muscle which it controls.

Now when the nutrition of the motor cells fails, or is in any way interfered with, as it is in the disease under consideration, the nutrition of muscle and nerve is likewise changed, and consequently their function is interfered with, as is manifested in the paralysis and wasting of the muscles. If these changes in the motor nerve cell and fibers are slow, changes in the muscle are likewise slow, and wasting and paralysis proceed hand in hand. We are thus able to understand the slow failure of electrical excitability, as nerve and muscle degenerate together. If the course of the slow degenerative action be varied by a more acute process, or if the original process itself be somewhat rapid, nerve cell and fiber are damaged more rapidly than muscle, and we have paralysis in excess of wasting with an excess of voltaic irritability over faradic.

This slow decay and degeneration of the lower segment of the motor tract is the essential lesion of the disease; the lesion upon which the conspicuous symptoms of wasting and paralysis are dependent and to which they are secondary. But while the lower segment of the motor path is the seat of essential pathological changes, it is by no means the only part of the motor path affected by the morbid process. We have already seen that the pyramidal tracts are frequently degenerated, and that this degeneration in severe cases may extend upward through the various parts of the motor path, and even involve the cortex of the brain. Thus the upper segment of the motor path is involved as well as the lower,—a fact which has not been recognized by many recent writers.

In the presence of complete degeneration of the lower segment, all symptoms which might arise from a disease of the upper segment by itself are lost. The loss of power that it would produce is also produced by degeneration of the lower segment; a degeneration of the lower segment abolishes myotatic irritability, excess of which is characteristic of the disease in the upper segment. Hence, during life there is nothing to indicate a degeneration of the pyramidal fibers relating to the muscles suffering from the atonic atrophy.

Sections 1, 2, and 3 represent transverse sections from the cervical, dorsal, and lumbar regions of the spinal cord in a case of *atonic muscular atrophy*. In these sections, especially 2 and 3, there will be noticed a decided degeneration of the crossed pyramidal tracts; yet during life there was nothing in the symptoms that would indicate any disease of the pyramidal tracts. The muscles of the legs, instead of being rigid with increased myotatic irritability (symptoms referable to disease of the upper segment), were atrophied, soft, and wasted, with the reflexes entirely abolished. Thus, while the pyramidal tracts are, in nearly every case, the seat of disease, there is not in the atonic wasting and paralysis of the muscles an indication that they are affected.

Charcot has described, under a separate head of *amyotrophic lateral sclerosis*, a class of cases rather large in number, in which there is paralysis and wasting of the muscles of the upper extremities, with paralysis and excessive myotatic irritability of the muscles of the lower extremities. In these cases the seat of pathological changes is usually in the cervical region of the cord. The condition of the lower limbs is explained by the degeneration of the pyramidal fibers of the legs, the lower segment being unaffected, while the wasting and paralysis of the upper extremities is accounted for by the disease affecting the lower segment of the motor path. It is easy to understand how multiform varieties may arise from the affection of one part of the motor path and the escape of the other, or an unequal affection of both.

The separation of this class of cases under the head of *amyotrophic lateral selerosis*, by some writers, especially Charcot, carries with it the idea that the changes in the pyramidal tract are the primary and essential lesion, and that the morbid changes in multipolar cells and anterior nerve roots are secondary to the changes in the upper segment. The necessity of the separate classification from a pathological standpoint seems doubtful when we consider that the pyramidal tracts are degenerated constantly, or at all events with very few exceptions, in all cases of progressive muscular atrophy.

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Whether there is any indication of this during life or not, depends on the relative changes in the two parts of the motor path. If the changes in the pyramidal tracts are excessive, while those in corresponding motor cell and nerve root are slight at any particular time in the history of the case, there may be symptoms pointing to a disease of the former. On the other hand, if the changes in the lower segment are greater than those in the upper, there will be no indications during life, so far as symptoms are concerned, that would point to any trouble in the upper. Then, again, we have no evidences in these cases under consideration that the changes in the pyramidal tracts are primary to, and the cause of, degeneration of motor cell and fiber in the lower segment. We have illustrations in our every-day experience, in cases of lateral sclerosis and dorsal myelitis, where there is a sclerosis of the pyramidal tract without any wasting of the lower limbs, and such a degeneration as is well known does not excite a complete degeneration of the lower segment which is the cause of atonic atrophy. On the other hand, it is doubtful if the disease in the anterior horn of gray matter is primary to the degeneration in pyramidal tracts. In poliomyelitis the anterior horn may be almost entirely destroyed, and yet it is not followed by any ascending degeneration of the related pyramidal fibers. Moreover, sections of the pyramidal fibers are not followed by any ascending degeneration.

Again, when sections are made through the spinal cord at different levels, in cases where the disease has been more marked in one part of the body than another, it will be found that the degeneration of the pyramidal tracts and anterior horns of gray matter go hand in hand; that where we find a marked degeneration of the one, we find an equal change in the other. This is shown in Sections 1, 2, and 3. In Sections 2 and 3 the degenerative changes are about equal, and well marked in the pyramidal tracts and anterior horn of gray matter and motor roots. In Section 1 the degenerative changes are not so extreme, but are about equal in gray matter and pyramidal tracts.

It would appear, from the foregoing, that changes in both the upper and the lower segment of the motor path occur simultaneously, or nearly so; that changes in one are not the cause or the consequence of changes in the other; that the separation of these cases, with atrophy and paralysis of the upper extremities, and paralysis with increased myotatic irritability of the lower extremities (so-called *amyotrophic lateral sclerosis*), into a class by themselves as a distinct and separate disease, seems uncalled for, at least from a pathological standpoint, and, as has been aptly put by one writer, is simply "giving a new name to an old disease."

The nature of morbid processes is that of a degeneration, a failure of the nutrition of the nerve elements with an increase in the connective supporting tissue. When the changes in tissue are rapid, the process probably approaches an inflammation of a chronic form, but the nature of the process in the main is at the degenerative extremity of pathological changes.

(To be continued.)

THE UTILITY OF ANTHROPOMETRY.

BY DR. HENRY CLARK.

If some one should ask, What is the utility of anthropometry? what is to be obtained from the values learned? he might be answered, The measurements compared together show (in case of the man measured) which of his dimensions have changed from time to time; and with a knowledge of the meaning of these changes, they show whether his progress toward health has been retarded or advanced. In case of a comparison between the dimensions of two men, it can be discovered (so far as dimensions have a meaning) which of the two is a better man, and in what his superiority consists; and in a series of measurements, it can be seen which man is making better progress toward a good condition, as well as in what lines any progress has been made. It may be interesting to illustrate these notions by actual examples.

A subject (case 1) has been rapidly and rather hopelessly growing fat. He wants to know how great the increase has been within a period of twenty days. Now the scales readily declare how much more he weighs than on the first date. It can be found in this way that he is heavier, too, than at an examination previously made. So much is known. As a

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matter of fact, however, there has been very little increase in his weight recently, and this he knows; yet he is anxious to learn whether his condition is as good. Now this, if we admit that symmetry is a sign of condition, is a matter easy to learn by the aid of the tapeline. For if, after measuring the man, we compare all dimensions with each other, like for like, we find that the dimensions show an excess of value toward symmetry; hence we may judge the man, although he continues to gain fat (or does not become thinner), to be a very good man, despite his extra fat. Should it be found, however, that girth of any region is increased in such a way as unduly or disproportionately to have increased that region, then it may be questioned whether the man should pay any attention to such extra development, as indicating deterioration or running down.

As I suppose there is considerable interest in this phase of development, I may cite some figures, to be referred to for illustration, endeavoring to make such an explanation of their meaning as will be understood. Suppose the subjoined results to have been reached, as shown by measurements twenty days apart, expressed in inches: —

	Previous Values.	Latest Values	Incre'se or Decrease.
Neck girth	17	16⅝	⅜
Biceps, r	16½	17⅛	⅝
Chest, natural	44¼	44	0
Chest, inflated	45	44⅜	0
Forearm, r	13⅜	12⅝	½
Waist	42⅜	42	⅜
Thigh, r	26⅛	27⅝	1½

We find on carefully comparing these figures, an increase in thigh and biceps; a decrease in forearm and waist; and a value about equal in chest measure.

Attention may be called to one or two apparent discrepancies in the foregoing figures, which are rather interesting as illustrating some unexpected variations. I refer to the large variations in values representing thigh girth, the measurement increasing ½ inch, and the neck girth decreasing ⅜ inch. These are accounted for by the changes in the business occupation of the subject, accentuating the thigh movement — walking up stairs — which shows its effect on the girth of the limb at the region measured. This man had such a constitution that the effect of a change in his limb movements was manifested even in the girth of the limb, and in so rude a test as that of the tapeline, in a distinct and appreciable manner.

It is in this way that the tapeline detects tendencies of certain occupations or pursuits in the marks they leave upon the body. I doubt not that moral motives leave equally plain marks upon us, which, if not eradicated, and if persisted in, change and transform the man, according to the persistency of the subject in certain lines of thought and activity, for better or for worse, and remain, perhaps, through generations of such as live in the ways of their ancestors.

A curious example or two are recollected by the writer, where a peculiar personal affliction so wrought upon a subject as visibly to affect his proportions. I shall refrain from quoting either case, but can well recollect in one the pitiful evidence of his grief in his varied proportions.

It is well known that the girth of the neck varies in favor of a larger girth in good condition than when the subject is sick. Girth of neck, too, is a tell-tale of condition when compared with girth of calf, both girths being often alike in good men. When the neck girth exceeds the girth of the calf, it may be guessed that the upper part of the body is too large.

I recollect a person who was presumed to be paralytic, in whom, having occasion to apply the tapeline for investigation, I found one leg girth smaller than the other. As this was the suspected limb, it might have been inferred that this deficiency showed some evidence of the paralysis. But the arm on the same side being measured, it was seen that this arm was smaller than the other, giving rise to a query whether the size of both limbs might not naturally be smaller in his case. These examples show plain results.

The investigations which ought in every growing boy to be often made, should teach one who knows how to read what indications are met, something of his tendencies, habits, and employments, so that when learned, the best means be taken for his growth aright, in heart, habits, and intellectual training, as well as in muscle and nerve. That he grows well, the tapeline will show the intelligent observer who knows what to look for and how to read indications of conditions or make-up.

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An example for illustration may prove interesting. G. (case 2) is a well-nourished, average lad. His dimensions were noted two years ago. Recently, the accompanying values were obtained, which by comparison, elicit the ensuing deductions: —

Age, Oct. 23, 1890, 14; Feb. 16, 1892, 16. Increase in age, one year and four months. Increase in weight, 19¼ lbs. Increase in stature, 3 in.; neck, 1⅛; chest, ⅝; waist, 3¼; bicep, approximate increase in right, 1⅝; in left, 1¾.

This short extract from considerably full notes on this subject elicits the remarks which follow: —

He is now an average boy of his age in development, but slightly tending toward less rather than larger size. His pulsation is not very strong; his chances for growth, therefore, are only average, since it is presumed that he uses most of his energy daily.

Taking these dimensions in their order, and calculating roughly each one regarding its proportion to stature, we have, in the first place, the ratio of weight to stature, 1.72; in the second, 1.93; showing (by subtraction) a relative thickening up of the boy, equivalent to .21 of his stature. His proportion of neck to stature, from .19 became in the later measurement .203, showing a larger proportionate neck than before. His "chest natural" shows, in like manner, a proportion of increase from ratio of chest to stature, .43 to .51, or .08 increase proportionally. His waist increase is .03 of his stature. In the right bicep, a variation in favor of the later dimensions amounts to .02; in the left bicep, to .02. A singular variation in the left bicep is noted, which value, contrary to what is generally expected, is larger than the right, while this unusual variation persists in the later measurements. His left bicep is, right along, larger than his right. The boy therefore, in the gain of nineteen pounds, shows the greatest increase of all in chest, waist, biceps, thigh, and calf, in the order mentioned, thus evidencing an excess of development lying largely in the chest, or at least in the upper part of the body.

Whether this sort of development is good is shown in two ways: First, by knowing whether his development corresponds in proportion with that of healthy boys of his age; and, secondly, by observing and comparing his condition at the present time with what he was at first. Both things should be considered in forming our judgment in the case.

We see, then, in so far as anything is to be learned in a hasty glance at this subject of anthropometry, that a judicious examination of the man can be supplemented and so certified in some particulars by the evidence which a tapeline supplies. We already know, after weighing a man, what he has gained or lost in weight, but we desire to learn just where the changes have been going on since our last examination. By applying a tapeline, we can see whether any part of the man has been too much exercised, or where a limb has grown, as well as how much any part of the man has failed of its normal nourishment. Then what changes are desirable as regards exercise and diet can be intelligently prescribed. I advised my patient (case 1) to cease eating an excess of fattening foods, while I could assure him he had lost nothing in efficiency or energy. The second man (case 2) I recommended to continue exercise in a general way. Both learned something by what was revealed by the tapeline.

DIET IN CERTAIN DISEASES OF THE KIDNEYS, STOMACH, AND LUNGS.

BY PAUL PAQUIN, M. D.

DUJARDIN-BEAUMETZ, while not an exclusive vegetarian, is one of the strongest supporters of vegetarianism from a physiological and therapeutic standpoint. No scientist has done more to prove the value of vegetarianism than he in the treatment of disease, or to indicate its hygienic scope in health. As in all reforms, many of its advocates have gone to the extreme, and radically banished all animal foods from their diet or the diet of their patients in all circumstances. On the other hand, while considering that vegetarianism is right physiologically, many of them refuse to admit that it is rational even as a means of treatment in certain maladies.

The writer, having studied the diet question for some time, both in the laboratory and in practice, has come to conclusions that sustain the vegetarian theory in most if not all conditions in health,

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but approve the use of animal foods in very many circumstances in disease.

The conclusions arrived at are as follows: —

First, because of the inheritance of civilization for centuries past, of constitutions based on anatomical and physiological conditions dependent largely if not chiefly on animal foods, a hasty, complete, radical change to vegetarianism is not always attendant with the best results in the *healthy adult*. But a gradual change may be effected with safety, and usually with great benefit. It is generally safe and useful for such an individual to reduce the meat diet to a minimum.

Secondly, it is very easy, and greatly beneficial to health, to bring up the young on a vegetable diet, inclusive of milk, which, during at least the first year or two of life, is practically indispensable.

Thirdly, in certain diseases (as will be seen farther on in this article), a vegetable diet is very beneficial, and often necessary for recovery.

Fourthly, a flesh diet is, on the other hand, often useful and necessary in other classes of maladies.

The studies and observations upon which the writer bases these conclusions are as follows: —

BACTERIOLOGICAL STUDIES.

To determine the toxic products generated in the system by the action of microbes and various fermentations in the alimentary canal, investigations were carried on which sustain the views expressed by others more learned; viz., that animal substances produce the maximum amount of toxines, such as neurine, muscarine, choline, peptotoxine, and toxic albumen; and that vegetable substances limit the production of these poisons to a minimum.

Without going into details, I may say that the aërobic and anaërobic germs that enter the alimentary canal, produce a much greater quantity, and possibly a greater variety, of toxic products when developing at the expense of animal cultures than they do on or in vegetable media. There are possibly some exceptions to this rule, as there seem to be among pathogenic microbes. The bacillus of anthrax, for instance, produces, it seems, as deadly a poison on potato media as in meat broth. From a bacteriological standpoint, however, it is safe to say, as the results of investigations indicate, that with a flesh diet which causes the production in the alimentary canal of more and greater poisons than do vegetables, the nervous system, the kidneys, etc., must suffer more than they would under a vegetable régime. We shall see by practical observations that this is actually a fact.

OBSERVATIONS ON A VEGETARIAN DIET IN HEALTH.

It is necessary to touch upon this point to realize the effects of diet in disease. I need not give observations of the influence of animal foods, except to draw comparisons with the effects of vegetarianism in cases where meats had been the staple article of the régime before.

Case A. — Male; 31 years; in healthy condition before beginning a vegetable diet; weighed 148 lbs.; refrained from flesh suddenly and entirely from a moral standpoint; used a glass of milk or cream once or twice a day; habits and exercise unchanged. After eight weeks his weight had dropped to 139 lbs.; the stomach suffered from bloating after each meal; strength was decreasing; and his sleep was dreamy, and failed to give satisfactory rest. He continued the same diet for three months longer, using grains, milk, cream, fruits, and various vegetables; weight decreased to 136 lbs.; dyspepsia became marked and painful; face sallow; and general condition miserable. Then he began to use an animal diet again, gradually, and all these unfavorable symptoms slowly disappeared, the strength was regained, weight increased to 152 lbs., the complexion cleared remarkably, and the symptoms of dyspepsia disappeared, until they are no more.

Case B. — Woman; aged 30; married; perfectly healthy in every respect; weight, 157 lbs; complexion bright and rosy; digestion good. She began a vegetable diet as above, with exactly the same results, and in addition, chronic constipation was produced, which lasted four months, and was difficult to cure, even after the return to animal foods. In this case, the complexion, which was remarkably clear under an animal diet, became remarkably dark and brown by the exclusive use of vegetables, milk, and cream for a period of three months.

Cases C, D, E. — Males; aged 50, 32, and 18 respectively; healthy; adopted

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vegetarianism by choice, using besides it some eggs, milk, cream, and butter daily; had about the same experience in three months' to one year's trial, more or less continuous. On the other hand, five cases of healthy adults,—students observed closely,—who adopted this régime on practically the same lines and as abruptly, did not experience any malaise; one indeed increased slightly in weight; viz., two pounds in a period of three months. The other four lost weight. Nearly all the cases above recorded, had bad breath.

Three more cases were observed, who made a *gradual* change from the animal food régime to vegetarianism, and experienced little or no bad effects; and after the change had been completely effected, all of them seemed healthy, and expressed themselves as completely satisfied. One appeared better than ever before, slept better, increased eleven pounds in four months, and could do more mental work. This man, it is well to say, had been a glutton before on animal foods and wine.

VEGETABLE AND ANIMAL FOODS IN CERTAIN DISEASES.

Case A.— Man; aged 32 years; suffering from prostatitis and inactive kidneys. Had been on rational treatment for three months; before that, had used a meat diet, *i. e.*, meat two or three times a day; weight, 162 lbs.; bowels constipated; tongue coated; liver periodically torpid.

The new treatment under my care consisted of a vegetable diet (grains, fruits, nuts) including milk once or twice a day, and for the first week, meat (beefsteak) once a day. At the end of this week, meat was banished for six weeks. During this period, under the same medical treatment as before; viz., large doses of hot water, local electricity, aided by massage and occasional hot baths, the patient became practically well. The kidneys were active, free, and the urine normal, and the prostate glands seemed at last cured.

From close observations I am convinced that the vegetable diet was of the greatest benefit in this case. The malady could not, perhaps, have been so easily cured without it. The patient lost in weight, but gained in health. And now, two months after the last day of treatment, the health is still good. The patient remains practically under a vegetable régime, eating but little meat.

Case B.— Man; aged 48 yrs.; suffered from albuminuria for two months; normal weight, 172 lbs.; weight at beginning treatment (after two months of perceptible illness), 145 lbs.

Treatment consisted of a physical tonic in the bathroom, lactate of strontium internally; vegetable diet, composed chiefly of the greatest amount of vegetable albumen, and including the free use of milk, and one glass of hot water before each meal. The result was anything but encouraging. The digestion became greatly troubled and complicated; weight decreased daily; albumen appeared more and more in the urine. Tube casts were exceedingly rare at the beginning of the disease and during treatment. Naturally, such a disease was not expected to yield readily to any treatment, but I expected some benefit from the strontium, which had given such good results in France, whence my supply was imported.

I then changed the diet completely to a fare of animal substances, mainly scraped beefsteak, game, fish, milk, cold and hot, with vegetables rarely. The balance of the treatment remained as before. The patient under this régime held his own, but the kidneys were too inactive to eliminate the waste products of such a heavy diet. Consequently, I ordered two to three full tumblers of very hot water an hour or so before each meal. By this method the kidneys were kept flushed, and their work was freer. The urine still continued to show a large amount of albumen, but the weight decreased no longer. After six weeks of this treatment, the weight began to increase, while albumen in the urine decreased; eight weeks, and only a trace of albumen remained in the urine. It is now ten weeks since the patient was put on the new treatment, and the weight has increased from 140 to 161 lbs., appetite is better, albumen very rare. Though I scarcely hope for a radical cure of this disease, I expect to prolong this patient's life; perhaps a cure will be effected; who knows?

Case C.— Man; aged 52 yrs.; suffered from dyspepsia contracted on a ham diet and by rapid eating; had severe gastralgia and vomiting for two weeks, and five weeks of dysentery prior to his coming under my charge. His normal weight

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was 164 lbs.; weight first day of treatment, 126 lbs. He had been kept for five weeks on grains, fruits, and boiled milk, and had continually decreased in weight to this low point. The sanguinolent mucous catarrh of the bowels progressed, notwithstanding the continual attempts on the part of the physicians to stop it. The treatment under my care consisted of the following: —

Cool baths; salt rubs; massage; hot water drinking before each meal; almost exclusive meat diet, consisting for three weeks of nothing but scraped beefsteak and zwieback milk toast. After this, grains and torrefied bread were allowed sparingly. Hot milk and cream were used occasionally from the beginning.

Medicinally, the only substances used, were at first, fractional doses of arsenite of copper for three days, followed by the administration of albuminate of iron (Flexner's) and celerina, equal parts, for three weeks. After this no medicine was given. The patient gained one pound a day regularly from the third day until he reached 147 pounds, and then continued to gain more slowly. He is still under my care, and improves rapidly.

Case D. — Woman; aged 28; married; has two children; suffering from subinvolution and tear in the external os; very nervous; dyspeptic; constipated; subject to severe intestinal colic from accumulation of gas; subject to headaches; kidneys inactive.

Treatment consisted of electrical applications, etc.; hot water internally; vegetable diet with milk, cream, and eggs. In nine weeks the kidney affection disappeared; elimination was better, certain forms of headache were almost completely eradicated; but the digestive troubles increased. I changed the diet so as to include animal food (scraped beefsteak), with very little vegetable food, but plenty of hot water. The kidneys remained sufficiently active, and the digestive difficulties were greatly improved. Neither diet seemed to have any influence on the uterine trouble or its treatment. The weight was not perceptibly changed by either of the dietetic régimes.

Case E. — Incipient tuberculosis. The treatment: Continued inhalation of eucalyptol and creosote in closed room. Patient averse to meats, but relished vegetables, fruits, milk, and cream. Took emulsion of cod-liver oil. Weight decreased perceptibly from day to day. Four weeks after beginning treatment, cough seemed less severe, but weakness increased. Changed diet as much as possible without forcing patient too much into a régime of animal foods. Gave plenty of liquid peptonoids. Wyeth's beef juice, scraped beefsteak, cod-liver oil, and the least amount of fruits except pineapple, which was urged because of its beneficial properties in digestion.

Under this régime, everything else being equal, the weight increased, the cough diminished, and the bacilli became much less numerous. The patient improved remarkably, and after a few weeks was able to move to a more congenial climate, having gained 13 lbs. in the last 40 days of treatment.

From these few observations, the observations and investigations of others, the experiments and laboratory studies I have made, and also from numerous other casual observations of patients in sanitariums and elsewhere, I am convinced that in health, the change from animal food to a vegetable diet is useful, and perhaps a necessary reform, in order to secure the best health physically, morally, and mentally; but in the adult the change must be made gradually and cautiously, under the physician's guidance, as at a sanitarium, for instance. In disease, a vegetable diet is useful in certain affections, and one of animal foods in others, but one must discriminate.

THE TREATMENT OF HEPATIC COLIC.

BY J. H. KELLOGG, M. D.

THE method of treating hepatic colic by hypodermic injections of morphia or the employment of opium in other forms, is objectionable for the reason that opium arrests the muscular action of the duct, the continuance of which is necessary to the expulsion of calculi. Chloroform, if carefully administered, is a better remedy, as it will relieve the pain without arresting the action of the muscular fibers of the duct. Pain can often be relieved, however, without the use of any drug, by the application of heat. Large fomentations applied over the region of the liver

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and stomach, or passing around the body, often give the greatest relief. The fomentation should be large and thick; an ordinary woolen sheet folded so as to be about eighteen inches wide, answers admirably the purpose; and two rubber bags filled with water, one placed behind, the other in front, are a very convenient means of applying heat in cases of this sort.

Laxatives should not be used at the beginning of an attack, but a large hot enema greatly facilitates the determination of the paroxysm. The hot bath is also considered of great service in these cases.

Most important of all is the prevention of an attack. There are certain prodromal symptoms which are commonly overlooked, but the recognition of which may lead to the employment of important preventive measures. These are described by Dr. Colladine, of Geneva, himself a sufferer from this disease, as follows: "A peculiar drowsiness, general torpor, even after a good night's rest, irregular arterial pulsations, especially at the temples, false sensation of hunger and emptiness of the epigastrium, or very pronounced nausea, constriction of pharynx, eructations and intestinal flatulence, excessive flow of urine, sense of constriction under the ribs, distention of stomach, tenderness in the region of the gall bladder. All of these symptoms above enumerated, indicate an irritated condition of the solar plexus. Hot fomentations, application of dry heat by means of rubber bags, hot enemas, and copious hot water drinking, if employed during the prodromal period, will often ward off the attack entirely, or greatly shorten the paroxysm."

It is well known that in a large number of cases in which the symptoms of hepatic colic are very pronounced, no calculi can be found. It is probable that in these cases the difficulty is wholly the result of an excited state of the solar plexus, and that no calculi are present. There is intense congestion of the liver, however, and this condition, if frequently repeated or prolonged by continued excitement of the plexus, may ultimately result in the formation of calculi. Consequently the condition is one which should receive careful attention. Preventive measures are of the greatest consequence in these cases, both when calculi are present, and when they cannot be found. They consist of the following precautions:—

1. The most careful regulation of diet, avoiding the use of condiments, flesh foods, alcoholic liquors, and tobacco. Tea and coffee must also be avoided. The patient must carefully abstain from everything that will excite the solar plexus. The diet should be nourishing, but not in excess; it should be plain and unirritating in character.

2. The patient must take abundant outdoor exercise, thereby promoting increased respiratory activity and consequent aid to the portal circulation. The exercise should be sufficient to induce vigorous perspiration; such exercise as bicycle riding, horseback riding, especially Swedish gymnastics, and Swedish medical gymnastics, are of particular value in these cases. Massage, which the patient may himself administer after being properly instructed by a competent physician, is also of great value. Massage is of course of greater value when administered by a skillful *màssauer* or *massauese*.

3. Some simple hydropathic measures are of very great value. Warm eliminative baths two or three times a week are of value in ridding the system of excretory elements, thus relieving the liver of some of its work. An electric light bath and a wet sheet pack are of special value. The wet sheet pack is administered by simply enveloping the patient in a sheet wrung out of cold water and covering him closely with several warm blankets, so as to promote reaction and perspiration. Habitually wearing a tight, moist abdominal bandage is another excellent measure. A towel should be wrung out of cold water, dry enough so that it will not drip, placed about the body, and covered with several thicknesses of flannel. If inclined to chill, the flannel wrapper may be covered with oiled silk or muslin. Daily fomentations over the region of the liver, two or three hours after meals, are also of great value. Copious hot-water drinking should be practiced daily one or two hours before eating; a large hot enema should be taken at least two or three times a week, in order to wash out the bowels thoroughly, and also stimulate the portal circulation.

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

GLYCOGENIC FUNCTION OF THE LIVER.

BY DUJARDIN-BEAUMETZ.

Member of the Academy of Medicine, Physician to the Cochin Hospital, Paris.

Translated by J. H. Kellogg, M. D.

(Continued.)

WE have studied, in the preceding lesson, the physiological basis of the glycogenic function of the liver. We have learned what are the conditions which the body must supply to maintain, at a nearly constant percentage, the sugar of the blood; and having examined the different theories which have been proposed in explanation of the passage of sugar into the urine, either permanently or temporarily, this lesson will be devoted to the study of the therapeutic conclusions which may be drawn from the premises already presented. The treatment of diabetes is a question of great importance, owing to the frequency of this affection.

According to the facts which I have presented in the preceding lesson, it is apparent that, for the cure of diabetes, it is necessary to reach directly the glycogenic functions of the liver, and to diminish them. Are we able to do this?—Yes, to a certain degree; but, unfortunately, the methods by which this result is obtained are more dangerous than the disease itself. This statement is based upon the belief that in destroying the hepatic cell, the glycogenic functions of the liver are likewise destroyed. I have demonstrated to you that the antiseptic function of the liver goes side by side with its glycogenic function; and that, in order that these functions should be performed physiologically, we must have a sound hepatic cell. The hepatic cells are destroyed by various processes, and particularly by sclerotic processes.

Unfortunately, in man such processes are quite too frequently produced under the influence of alcoholic drinks, in which we see a true physiological experiment, and which, by destruction of the functions of the liver, may cause the disappearance of diabetes. However, I see no advantage in substituting for an affection so tractable as diabetes, a disease so incurable as cirrhosis. Hence this method of procedure must be abandoned as a therapeutic resource.

Another method consists of depriving the diabetic man of nourishment; and the experiments of Claude Bernard have demonstrated that the glycogenic function disappears after prolonged abstinence. But when a man is deprived of nourishment, he draws his nutrition from his own tissues; and in diabetics, this draft upon the tissues is so great that emaciation occurs with extreme rapidity. This method also is one that cannot be employed, since it is more dangerous than the disease.

Being thus unable to act directly upon the glycogenic function of the liver, we are forced to take an indirect method, and address ourselves to the origin of the glycogenic function. Although the knowledge of the glycolitic power of the blood has given rise to some very interesting conclusions from a pathogenetic and physiological point of view, we are not able to draw therefrom any therapeutic indications, since we are ignorant of any means of increasing the power of the blood to destroy sugar.

There remain to be examined two other causes which affect the production of diabetes.

As you will recall, from the statements made in the last lesson, the glycogenic function of the liver is controlled by two great functions, the intestinal function and the nervous function. It is from the digestive tube and from the food, that the liver obtains the sugar which it stores under the form of glycogen. On the other hand, the nervous system controls this same glycogenic function. If to these two sources we add a special nutritive state or predisposition, originating in heredity or diathesis, in consequence of which we see a more or less persistent diabetes occurring in persons who have reached a certain age, you will have three sources which may be reached by therapeutics in combating diabetes, and we shall have three classes of remedies to study: 1. Dietetic; 2. those which affect the nervous system; 3. constitutional.

The hygienic treatment comprises two parts: 1. Dietetics; and 2. general hygiene. At the present time, all are agreed that alimentary hygiene is the capital

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point in the treatment of diabetes, and that its influence upon the disease is so preponderating that when we do not succeed in reducing the sugar by the rigorous exclusion of farinaceous elements from the dietary, it may be confidently affirmed that all other means of treatment will fail, and that the case is one of grave diabetes.

The dietetic regimen required in cases of this kind consists, as you know, in the suppression of all foods capable of furnishing sugar to the body. Of the four dietetic methods heretofore employed,—that of Dongkin, that of Cantani, that of Seegen, and that of Bouchardat,—one alone has been adopted in all its parts. The treatment of Dongkin, which has for its basis an exclusive milk regimen, is dangerous. That of Cantani, who employs exclusively fats and meat, and which introduces a rigorous diet only at certain times, is too limited, and under its influence the patient loses appetite. It should never be forgotten that any treatment which destroys the intense appetite of the diabetic patient, is a dangerous treatment. As to the alimentary treatment of Seegen, it is precisely analogous to that of Bouchardat. This method has been termed the mixed treatment. It consists in giving meats of all sorts, eggs, corn, vegetables, cheese, and gluten bread. The question of bread is one of the most important in the diabetic regimen. Accustomed from infancy to this food, we suffer greatly when deprived of it, and there are some patients who cannot be nourished without bread, which is one of the weak points of the fat-and-meat diet of Cantani. So, when Bouchardat introduced gluten bread as a food for diabetics, he afforded great relief to patients suffering from this disease. But there is gluten bread and gluten bread; and recently, Carles has given us a very interesting analysis of different gluten breads compared with ordinary bread.

[This analysis, which comprised gluten breads from Marseilles, Toulouse, Paris, and Bordeaux, showed a proportion of starch varying from 19 to 32 per cent. Ordinary white bread contains 70 per cent of starch. The amount of gluten varied from 45 to 50 per cent. The proportion of gluten contained in ordinary dry white bread is 9 per cent.]

The difference between the amount of starch contained in gluten bread and that contained in ordinary white bread is certainly very great; but here, as elsewhere, it is a question of quantity. If a patient, instead of eating 100 grams of ordinary bread, eats 200 grams of gluten bread containing 31 per cent of starch, his ordinary diet would not be materially or beneficially modified. It is for this reason that I prefer the crust to the soft portion of bread, although recognizing the fact that the inner portion of the loaf contains less sugar than the crust. Thus the crust contains 76 per cent of sugar, while the soft portion of the loaf contains but 52 per cent. But one eats much less of crust than of soft bread, hence the advantage of the crust. There are made and sold to-day, commercially, breads which are all crust, and these are especially adapted to the treatment of diabetics, since the weight of a loaf does not exceed one ounce, and one of these loaves may suffice for a meal.[1]

The bad teeth of diabetics often prevent the use of bread crust, and lead them to employ a considerably larger quantity of soft bread.

It is also this question of weight which determines whether or not potatoes should be eaten. The potato contains less sugar-producing substances than does gluten bread. [While this is true of the gluten bread of Paris, it is still more emphatically true concerning the so-called gluten breads sold in this country, which, without exception, so far as the writer knows, contain nearly if not quite as much starch as ordinary whole-wheat bread. We except only the gluten biscuit already referred to in a foot note.] But a potato of the average size weighs about three and one third ounces, while the same weight of bread has a much greater volume. An invalid might satisfy his desire for farinaceous foods with an ounce of gluten bread, or an equal quantity of bread crust, while he would be scarcely satisfied with a single potato; and, as the potato would weigh three times as much, it is evident that in eating a single potato, the patient would eat a much larger quantity of sugar-producing matter.

[1] These loaves, as generally sold by the bakers in Paris, are about five or six inches in length, half as thick, and hollow, consisting solely of a crust or shell of bread about one eighth of an inch thick, baked until as brown as molasses, and slightly burned. They have a bitter flavor, due to the presence of caramel or burned sugar. The writer has never seen anything of this sort in the United States. The only genuine gluten biscuit made in this country, are those manufactured by the Sanitarium Food Co., Battle Creek, Mich., whose gluten biscuit contain less than three per cent of starch, or less than one sixth the amount contained in the best gluten bread sold in Paris. J. H. K.

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A glance at the following table, borrowed from Esbach, will be found interesting in this connection : —

PERCENTAGE OF SUGAR OBTAINABLE FROM EQUAL QUANTITIES OF	Per Cent.
Gluten bread	18
Crust of ordinary bread	76
Soft portion of ordinary bread	52
Boiled potato	17

The attempts which have been made to substitute other substances for gluten have not been successful. First of all, there is *soja*, a curious Japanese bean, which contains no starchy matters, and which I have indorsed. Unhappily, the oil contained in this seed renders its use in bread-making difficult, and it has a special taste which is not well liked by diabetics, especially when required to use soja bread for a long time ; consequently in spite of the small quantity of sugar-producing substances contained in soja bread, the attempt to manufacture it in Paris has been abandoned.

The same is true of fromentine. This name has been given to a flour made from the embryos of wheat which the new process of milling enables us easily to separate from the other constituent parts of the grain. Unhappily, in this also the oil of wheat, purgative like that of the soja bean, renders its panification difficult ; and in spite of the attempts made by Bovet and Douliot, fromentine has not yet come to be largely used as a food. The same is true of attempts made by Bovet with legumine, and, finally, those made to-day under the name of embryonine.

All these attempts are very interesting, but they are only attempts, and it is greatly to be desired that they may be carried to an industrial success, as the flour obtained from these embryos has not the disagreeable taste of the soja bean, and it contains, as does the soja, a large proportion of nitrogenous substances, with a very small proportion of starchy matters. Milk is absolutely contra-indicated in the dietetic regimen for diabetics. The same is true of fruits. The latter restriction is not sufficiently insisted upon by physicians in the prescription of a diabetic regimen ; and these patients, feeling the need of a refreshing food, sometimes make a large use of fruits. Fruits contain sugar, which is very easy of assimilation, and I think must nearly always be proscribed. I say *nearly* always, for fresh almonds, hazel nuts, and walnuts may be allowed. The following analysis, borrowed from Mayet, shows the percentage of saccharine matters contained in the different fruits : —

	Per cent.
Currants	1.5 to .8
Melons	7.5
Raspberries	8 to 10
Oranges	10
Cherries	10.3
Peaches	10
Figs (fresh)	15
Figs (dry)	71
Prunes (fresh)	16
Prunes (dry)	42
Raisins (dry)	79

As to alcoholic drinks, I maintain more than ever the absolute necessity for the restriction of their use. I have stated that it is possible, by the abuse of alcoholic drinks, to cure diabetes by destroying the liver, and I have made a number of clear observations of this sort among those diabetics in whom one observes the disappearance of sugar at the same time that ascites makes its appearance,—ascites produced by alcoholic cirrhosis. But I see no advantage in transforming a curable malady into an incurable one.

It is necessary, then, that the diabetic patient should be temperate, and that, if the use of a tonic is required, alcohol should not be employed.

I am very partial to kola in diabetics. Unhappily, there is still a certain difficulty in the administration of this drug. It is necessary to employ kola in the form of an infusion or powder, or, what is preferable, the fluid extract, of which 20 drops should be administered two or three times a day.

As to saccharine, I expressed myself with reference to this drug long ago. If saccharine sometimes produces cramps in the stomach and digestive disturbances, it is the result of its too prolonged use, or of individual circumstances. If care is taken to interrupt its use from time to time, and to avoid the use of too great quantities, saccharine renders great service to diabetics who are unable to dispense with the use of sugar.

In conclusion, as regards hygiene, I must speak of exercise and the care of the skin and the mouth. We have seen in the preceding lesson that sugar is burned by respiration and by muscular exercise. It is then necessary, in diabetics, to com-

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bat the morbid condition present by exercises adapted to the strength of the patient.

I indorse all that Bouchardat has said upon this subject. Certainly it is necessary not to go to excess in exercise, not to carry it to the point of exhaustion, which is attended by even greater dangers than sedentary habits in diabetics. It should not be forgotten, however, that in diabetics the excessive production of sugar induces the phenomenon of depression; and in spite of the appearance of the most robust health, the diabetic is feeble, and cannot endure fatigue. It is necessary, then, to restrict him to such exercises as are appropriate to his taste and strength. Alpine excursions at a proper season, hunting, gardening, walking in the open air, massage, fencing, horseback riding, and carpentry, are all exercises which, under proper circumstances, may be profitably employed.

This necessity for exercise explains how certain diabetics observe that the sugar appears in the winter season. In winter, the diabetic goes out very little, and lives high,—circumstances very unfavorable. In summer and hot weather, he goes out into the country, undergoes a real training, and from the effect of these exercises the proportion of sugar in the urine reaches its minimum.

All-important also is the care of the skin. Hydrotherapy, or sponging with hot water to which a little cologne water has been added, followed by energetic friction of the dry skin with a hair glove, are absolutely necessary.

Finally the care of the mouth, which appears to be neglected by many physicians, is also indispensable. Let us recall that by the presence of sugar in the saliva, and the fermentations to which it gives rise, the cavity of the mouth becomes a favorable culture-medium for a great number of microbes, of which some are pathogenic. Furthermore, the gums soften, become separated from the teeth, and suppurate, while the teeth decay, crumble, and fall away.

It is necessary, then, that diabetics should give great attention to their teeth and gums, with gentle friction after each meal. The following prescription in the morning and evening has given me the best results:—

Boric acid	25	parts.
Carbolic acid	1	part.
Thymol	¼	th part.
Water	1000	parts.
Essence peppermint	10	drops.
Tincture of anise	2½	drams.
Cochineal	q. s.	to color.
Alcohol	3⅓	ounces.

Great care must also be taken of the mucous membrane of the genitals. It is well known that sugar in the urine gives rise, in women, to a most distressing pruritis, often accompanied by eczematous eruptions which may extend to the inner surface of the thighs, and in men, the irritation of the prepuce gives rise to phymosis. It is necessary, then, that the patient suffering from this disease should be instructed to bathe the genitals after urinating, with antiseptic solutions, as naphthol [hydro-naphthol dissolved in water, and used in the proportion of one dram to a gallon of water].

AUTO-INTOXICATION OF INTESTINAL ORIGIN.[1]

(Concluded from October No.)

One may recognize in these facts, something analogous to poisoning by sausages, which has been known for a century and a half, since 1735. Similar facts abound. Muller, in 1869, had collected 263 observations.

Many investigations have been made of the extracts of meats. These researches were without result until Hoppe-Seyler discovered the existence of an alkaloid, but without demonstrating its toxic character. Brouardel and Boutmy, more fortunate, demonstrated the toxicity of the alkaloid found in the viscera of a woman who died after having eaten of preserved goose. This alkaloid presented some analogies to conine, though in some particulars different.

It is certain that true poisoning may result from eating tainted meats. Gaspald and Panum have demonstrated that the putrefaction of meats engenders a poison capable of producing grave and fatal symptoms; but in these cases the symptoms appear early. They begin within half an hour after the tainted meats have been eaten.

Besides, in general, one does not eat meats which are actually putrefied, and those already capable of producing poisonous symptoms. In flesh as used for food, putrefaction has only begun.

[1] Translated from M. Bouchard' swork entitled, "*Leçons sur les Auto-Intoxications dans les Maladies*," by J. H. K.

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In the interior of the flesh, microbes are at work setting up a process of decomposition which will continue, under favorable conditions, after the tainted flesh has been introduced into the digestive tube. In these cases, the symptoms which result are slow in making their appearance. They appear only eight or ten hours after the suspected foods have been swallowed. In this period of incubation, no symptom indicates the explosion which is about to occur, but when once the poison is formed, the toxic symptoms appear with rapidity. Krautzer gives an account of sausage poisoning. Four persons regaled themselves with Wurtemberg sausages, very slightly cooked, for gormands prefer sausages of which the superficial portion alone has undergone the action of heat. Of these four persons, only one escaped; the other three were sick, and one of them died. After eighteen hours of incubation, the symptoms experienced were identical and of nearly the same intensity. They consisted of disturbance of vision,—strabismus, double vision, ptosis, dilatation of the pupils,—and symptoms of paralysis. The injections of pilocarpine which were made did not produce sweat. We see here intoxication by a poison which dilates the pupil and prevents perspiration, and which, consequently, is not without analogy to atropine.

Now, among putrid alkaloids there is one with analogous properties, which I have extracted from the fæcal matters of patients suffering from typhoid fever, a disease in the course of which the intestinal putrefactions are intense. We sometimes see family epidemics, and also analogous epidemics, affecting all the people of a locality. The unsound flesh of animals is consumed by the people of an entire village on the occasion of a feast in which everybody participates. The incubation of the symptoms being long, the first symptoms do not appear, and the distribution of the tainted meat is continued to the people from neighboring villages. These return to their homes, are taken with identical symptoms, and a series of little epidemics present themselves, having for their origin the infection caused by the tainted meat consumed in the village where the feast occurred.

A dozen years ago I had a controversy with Lebert respecting the interpretation of an epidemic at Andelfingen. In this little Swiss village, numerous deaths resulted from poisoning by tainted meat. However, there was in every case a slow incubation, and a long duration which eliminated the idea of poisoning. It appeared much more like a disease which little by little developed itself in an individual, and continued after the complete elimination of the tainted flesh. In such cases even the sound matters taken afterward undergo putrefaction in their turn.

Apropos of this disease, trichiniasis and typhoid fever were proposed. Griesinger was a partisan of the last opinion. Lebert, on the contrary, leaned toward intoxication by tainted meat. Having come into possession of the facts, I insisted upon the long duration of the incubation which was observed in the patients. It has been demonstrated since that trichiniasis was not the cause of the epidemic. The autopsy of some of those who had been sick at the time and recovered having been made a long time afterward, no calcified cysts were found in their muscles.

Why had certain persons no symptoms of the disease in spite of the fact that they had eaten the same flesh as those who were sick, or had died? It is probable that they ate the exterior parts, in which the action of the heat had in part neutralized the poison. In the family epidemic of which I have spoken, in which the four persons ate sausages, one remained without symptoms. This fortunate person was the apprentice, to whom his master had given the crust of the sausage, much less prized than the center, but in which the microbes had been destroyed by the action of the heat.

The infection in the case to which I refer, is not an infection without some relation to the intoxication, for there is not a general infection of the body, but an infection of the surface. Without doubt there is, then, an increase more or less rapid and enormous of the quantity of infectious agents introduced into the digestive tube, but the intoxication occurs secondarily to the infection. There are some infectious maladies in which the microbes inhabit the blood. They may extract oxygen from the globules, or produce embolisms in the little vessels. There are other infectious maladies in which the microbes are present in certain tissues and provoke anatomical lesions. In all these cases the symptoms

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and the death are easily explicable; but it is otherwise with infectious maladies in which the microbes exist only upon a mucous surface; in which they do not penetrate the tissues and do not affect the limiting membrane. How, in these cases of surface infection, may we explain the general symptoms and death, if not by poisoning by the intoxication? The peril for the organism may result only from its absorption of the toxic products secreted by the infectious agents. The minute microbe manufactures poison as well as the great mushroom.

There are some cases in which the affection does not act in an acute, transitory manner, but during some months, or even years. It is due to habitual putrefactions, of which the digestive tube is the seat in many chronic maladies which affect it, and which prevent the complete digestion and elaboration of the food. This is seen in cancer of the stomach, and in certain chronic dyspepsias, and in dilatation of the stomach. Then, besides the inconveniences which, from the point of view of nutrition, result from imperfect digestion and insufficient alimentation, we see other symptoms and disturbances which attest the chronic deterioration of the organism by an intoxication.

Transfusion of the Blood of Dogs Vaccinated against Tuberculosis for the Treatment of this Disease.— In 1888, Messrs. J. Hericourt and Chas. Richet published a note concerning their experiments in the transfusion of dog blood emanating from animals having been vaccinated against tuberculosis, and its effect in producing immunity. Since then the experiments of these specialists have been repeated in many parts of the world, with more or less variations. The above named writers have carried out numerous investigations, and tested their method of treatment of tuberculosis on numerous dogs, the canine, as is well established now, being exceedingly sensitive to the infection of human tuberculosis.

Thirteen dogs having received a dose of 0.1 c.c. of culture per kilogram (about two pounds), the death rate was 100 per cent. Death occurred usually between 26 and 50 days after the inoculation; minimum, 12 days. Eighteen other dogs, treated previously by various methods which had neither favorable results nor unfavorable, received a similar dose of culture, and death occurred mostly between 32 and 59 days; minimum, 149 days. Here is, then, a total of 31 dogs, all killed in the average period of 31 days by inoculation of cultures of tuberculosis. This fact being plain, it is possible to appreciate the influence that any treatment tried on dogs infected with human tuberculosis may have.

We have observed that in the transfusion to these infected dogs, of blood of vaccinated dogs, the disease was retarded and even arrested.

We had demonstrated before, that aviary tuberculosis vaccinates against human tuberculosis; likewise the blood of vaccinated dogs employed as a means of treatment is very efficacious, as the following will show: —

In the first experiment (June, 1892), four dogs were inoculated for human tuberculosis; dog A witness, died the sixteenth day; dog B, having been vaccinated once, died on the 104th day; dogs C and D received three days *after* the inoculation of *virus*, some blood of a vaccinated dog, and died on the 84th and 51st days respectively.

On the 5th of August, ten dogs were inoculated for tuberculosis, two of which had been previously vaccinated and are still alive and healthy.

Four witnesses died after a survival of 32 days (maximum, 47). The last four received, the tenth day of the infection, a transfusion of blood of a vaccinated dog. One died the 22nd day, another the 43rd day. The other two, though very sick after the transfusion, are still living, and are well after 105 days of survival.

This seems to use the secondary action, that the transfusion of vaccinated animals experiences the development of tuberculosis, and it may be possible in the future to specify the most favorable conditions in which this malady may be applied for treatment.

Peroxide of Hydrogen as an Aid to Diagnosis. — E. Stuver has suggested the injection of peroxide of hydrogen as an aid to diagnosis, in cases in which pus in a closed cavity is suspected. The injection of peroxide of hydrogen (Marchand's), with a small syringe, is very quickly followed by distention of the part when pus is present.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Haffkine's Phenated Vaccines against Cholera.— Dr. Tamamcheff, of Tiflis (*Annales de l'Institut Pasteur*, No. 10, page 713), presents a résumé of the experiments with this carbolized vaccine in producing immunity against Asiatic cholera. This vaccine is prepared as follows: Two cultures of minimum and maximum strength are prepared in the usual way known to bacteriologists. These cultures are made on gelatine prepared in the ordinary way, placed in test-tubes 16 c. long and 1½ c. in diameter, set so as to give an inclined surface about 10 c. long. The quantity of vaccine produced in a tube of this dimension in 24 hours at a temperature of 35° C., constitutes a unity of measurement. When the culture is complete, 6 c.c. of a ½ per cent aqueous solution of carbolic acid is poured into the tube; the culture of the surface of the gelatine is scraped off with a glass rod or a drawn glass tube, and the mixture is shaken until a uniform emulsion is obtained. This emulsion is gathered in six globules of glass, sealed at the lamp, containing thus, 1 c. c. of emulsion corresponding to ⅙ of the total of each tube of culture, which is a proper dose for an adult. After a little while the microbes are killed by the action of the antiseptic, and from that moment the vaccinal fluid contained in the little glass bulbs may be treated like any other pharmaceutical preparation, that is, it may be preserved and shipped.

Besides this the carbolization presents the advantage of attenuating the local irritation, etc., consecutive to the hypodermic inoculation. Thus treated, the vaccine does not produce induration. The strong vaccine introduced does not cause necrosis. The object in view in the injection experiments with carbolized vaccine, first, was to discover the degree of immunity conferred by these vaccines; secondly, to compare this immunization with that conferred by living vaccines; thirdly, to determine in what measure carbolization attenuates the toxic action of anti-choleraic vaccines.

The conclusions arrived at are as follows: First, the carbolized vaccines of Haffkine retain their immunizing property during at least 18 days after preparation. Second, the immunity conferred by them seems to be in no way inferior to that obtained with living vaccine. Third, the toxicity of anti-choleraic vaccines is much reduced by the carbolization, as manifested not only by the attenuation of the local reaction consequent on the inoculation, but also by the diminution of the effects produced by intraperitoneal injections. Fourth, the febrile reaction produced in the human body by the carbolated and living vaccines is strictly analogous, which permits the conclusion that there is a complete analogy between the immunizing action of these two kinds of vaccines.

Erysipelas of the Face Complicating Typhoid Fever.— M. N. Eisendrath (*Archives Medicale Belges*, Sept., 1892, p. 186) relates four observations of erysipelas of the face having appeared as complications of typhoid fever. The former disease appeared in every case during convalescence of the latter (between the 21st and 27th days). Death occurred in each case. It is argued by the author that the entrance of the microbes occurs through erosions in the mucous membrane of the sphenoidal sinuses and occasionally perhaps by buccal ulcerations. In the cases in question, it is very probable that small nasal ulcerations served as ports of entry, for in both cases there was abundant epistaxis. It is believed by some authorities that such complications are not due to the germs of erysipelas, but probably to the germ of typhoid fever itself.

Does Immunity against Vaccine for Charbon Cause Immunity against Tuberculosis? — M. Perroncito (*Centralblatt fur Bakteriologie*, XL, page 436) had observed that in stables where vaccination of cattle against charbon had been practiced, tuberculosis, which decimated cattle to a certain degree every year, disappeared about the same time as charbon. In order to find the meaning of this coincidence, he made the following experiments: —

Two cows were vaccinated against charbon and then inoculated several times with virulent charbon virus, to reinforce their immunity. They were after-

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ward inoculated with pure cultures of tuberculosis. Two months later these cows were killed, and found entirely free from tuberculous manifestations. One cow attacked with advanced tubercles, was vaccinated against charbon and afterward with charbon virus; after two months the tubercles were all found calcified.

Inoculations practiced with portions of the freshest of these tubercles on guinea-pigs and rabbits, were without effect. Another tuberculous cow was inoculated the same way, and allowed to run. She seemed to recover, and actually gives much milk. A calf to which she gave birth later, began to cough. It was vaccinated against charbon, and is entirely well. Finally, four rabbits rendered immune against charbon by Pasteur's method and subjected to inoculation of strong virus, were inoculated after 16 days with tuberculosis. A month later the glands situated near the point of inoculation were swollen. Another inoculation was made, to which they succumbed in 48 to 50 hours, proving that the immunity against charbon had disappeared, a fact which explained the development of the tubercles. M. Perroncito thinks that vaccination against charbon protects against tuberculosis.

Tuberculocidin.— The Pacific *Record* gives the following interesting notice of this chemical substance prepared by Prof. Klebs, of Zurich. It is a new preparation of Koch's tuberculin and seems to have a favorable action. Says the *Record:* "Prof. Klebs thinks he has succeeded in eliminating from tuberculin the injurious matters contained in it, preserving its pure curative substance in an isolated condition. Tuberculocidin differs materially from tuberculin in its mode of action. Neither in animals nor in men, healthy or tuberculous, does it excite fever, even when administered in doses as high as one gram, which, it is alleged, the human as well as the animal organism supports without injury. Any disturbances which may appear are without importance, and pass away rapidly. The very increase of temperature in the body, after injecting a certain dose, is considered to be a sign that it should be augmented in order to obtain a favorable effect; for the high doses reduce fever and suppress the much-dreaded hectic fever, with its diurnal fluctuations of sometimes as high as 4° C. In its mode of action it also differs essentially from tuberculin, inasmuch as, according to Klebs, the tuberculous tissue is not attacked by it, and the tubercular bacilli are killed directly. On this account it is exempt from the injurious consequences of tuberculin treatment, especially with regard to the further extension of tuberculosis. In animals (guinea-pigs), Prof. Klebs has obtained complete healing; in men, his results were as follows: Perfect cure, 18.6 per cent; improvement, 60 per cent; without improvement, 18.6 per cent; deaths, 2.6 per cent."

The Germs of Cholera and Their Destruction.— It has been well established that the germs of cholera are to be found in the soiled clothing and dejections of the sick, and that they contain a great deal of vitality which may be prolonged a very long time, sometimes longer than a year. In a recent discussion before the Academy of Science in France, various methods for the destruction of the germs were recommended, and numerous sanitary measures were presented for the purpose of excluding cholera from European ports. It is noticeable that in many of these plans, or methods, the mode of destruction which seemed to be considered the best was the action of steam under pressure. This plan had been demonstrated theoretically by the Committee of Hygiene, and practically two years ago, during the epidemic of cholera in Spain, where steaming had been practiced on clothing, etc., before the introduction of the disease from infected districts. This is the system chiefly employed in the United States.

The Bacterium Coli Communis.— M. Lesage, in various communications in France and abstracts made therefrom in Germany, gave it as his opinion that the virulence of this germ depends in a very great measure on the source from which it is obtained. When obtained from the normal intestinal canal, it is not pathogenic for animals; on the other hand, when from a case of diarrhœa, cholera nostras, or infantile diarrhœa, it is markedly pathogenic, and produces similar infections; when from an abscess, its effects are of a local character, and produce a local suppuration.— *International Medical Magazine.*

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ANTHROPOMETRY.

IN an interesting article by Dr. Clark, in this number, the great value of anthropometry is pointed out and forcibly illustrated. It cannot be questioned that many facts may be learned by the use of the tapeline alone, in reference to the physical condition of men and women. Dr. Giovanni, of Milan, has recently published, in Italian, a work on the morphology of the human body, which gives the results of a very careful study of some thousands of cases with a view to determining the relation between the external configuration of the body and internal conditions. Some very important facts have been elicited by this method of investigation, which seems to have been carried farther upon a scientific basis by Dr. Giovanni than by any previous investigator. The tapeline certainly affords important information respecting the physical condition of an individual, not only as regards development, but especially with reference to the static relations of the abdominal viscera.

As regards physical strength, however, the tapeline falls short in one very important particular: It gives no definite information respecting the quality of muscular structures, which are the direct source of mechanical energy in the human being. Bone and adipose tissue, as well as the muscular structures, constitute a certain proportion of the volume of the body or any part of it. Much of the data obtained by a tapeline includes these inert elements without giving the slightest indication of their proportion. It thus appears that the tapeline can give only an imperfect knowledge of quality as regards the muscular structures, and can give no information whatever as regards quality. A limb recently paralyzed may present precisely the same dimensions as the opposite limb, the muscles of which are able to exhibit their fullest energy. An arm may have more than doubled its lifting or striking ability, and yet measure less than before, the increase in the size of the muscle having been less than the decrease of adipose tissue resulting from the training. This is especially true in persons who have passed the age of forty or fifty years. After forty-five, it is difficult, usually impossible, to make the muscles increase in size by exercise. A great improvement in quality may be effected, but the volume remains practically the same. This is a fact which is easily overlooked by trainers and gymnasts in general, for the reason that the majority of those who devote themselves to gymnastics, or who place themselves in training, are under thirty years of age. In persons under training who are less than twenty years of age, the increase in volume of a muscle, as the result of exercise, may be very great; but in persons who have reached middle life, as before stated, little or no change in volume can be effected by the most thorough or prolonged course of training. The tapeline, then, is of greatest value in the young. It affords almost the only means of studying the question of symmetry in bodily development, and, as such, its value is unquestioned.

The writer's experience in physical training, covering a period of nearly twenty years, has been almost altogether with adults, the majority of whom were in "poor condition," as the result of disease. Many cases have been encountered in which obesity and plethora were

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present to a very marked degree. Of course, in these cases, the tapeline affords no useful information whatever respecting the strength of the patient. In many cases, also, a recently developed paresis gave rise to distinct evidence of weakness of one side, or one half of the body, without there being any corresponding or noticeable change in the dimensions of the affected parts. These facts, together with the frequent observation that the measurements of a muscle decreased while the limb was actually increasing in strength, in consequence of a change in the movement of adipose tissue and an increase in the specific gravity of the body as the result of gymnastic training, led the writer, some ten years ago, to devise a method for determining the quality of muscles by testing the actual strength or lifting capacity of the several groups of muscles in the body. A careful study has been made of more than 2000 people of both sexes, and the results have continually confirmed the observations above made, respecting the efficiency of the tapeline as a means of determining either the absolute or the relative strength of a muscle or a limb.

Some of the results of this study the writer has recorded elsewhere. It is only referred to here for the purpose of noting the fact that anthropometry, valuable as it is, within certain limits, needs to be supplemented by some more accurate and positive means of studying muscular quality. J. H. K.

A NATURAL FEMININE WAIST.

How large ought a woman's waist to be? is a question which intelligent women sometimes ask their medical advisers. This question is, however, distinctly a modern one. Up to within a very short period, the question which the average woman has asked herself has not been, "How large ought my waist to be?" but "How small can my waist be made?" In addition to the application to the waist of as much constricting force as could be conveniently or safely applied for the purpose of making the waist smaller, women have employed a variety of devices for making the waist appear smaller than it really is,— an evidence of the great interest which in the feminine mind centers in smallness of the waist as a desirable feature of the figure.

The writer was much astonished a few years ago to hear a learned Eastern physician, a professor of gynecology in an Eastern medical school, announce himself as a defender of the beauty and naturalness of the small waist in women, in a discussion of a paper relating to the subject. He asserted that from boyhood he had been taught that a small waist was one of the most essential elements of beauty in a woman. The query rose in the mind of the writer, whose paper the speaker referred to was attacking, By whom was this professor taught such a theory? Certainly not by the professor of gynecology at his *alma mater*, neither by any sculptor or painter of renown, nor by any teacher of art or æsthetics. Such physiological heresies could not come from any scientific source. He had evidently taken lessons from some poor devotee of fashion, or perhaps from the fashion magazines, or the models in the dress-maker's show window.

It is needless to say that such absurd and groundless views were promptly discountenanced by the audience and that section of gynecologists and obstetricians of the American Public Health Association. Nevertheless, the speaker's views represent those of a few physicians, of whom Dr. Wm. A. Hammond may be named as the foremost, since he wrote, a few years ago, an article for the *North American Review*, in which he made a serious defense of corsets and skirt bands, declaring that the large hips of women were evidently made by nature for the purpose of carrying burdens.

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For some years the writer has been collecting data in relation to this subject, and has encountered some very interesting and some very positive facts, which have been recorded in various medical papers,[1] and which may be very briefly summarized as follows, so far as they relate to the waist proportion of the feminine figure: —

1. The anterior line of the trunk in a normal woman is a continuous curve from the upper end of the sternum to the pubes, slightly flattened only at the epigastrium, not at the point commonly known as the waist. A flat or furrowed waist is not to be found among uncivilized women who have never worn corsets or waistbands, but is universal among civilized women over twenty years of age who have worn the conventional dress, and who are not extraordinarily obese. The waist furrow is not infrequently found, even in very stout women, as the result of their extraordinary efforts to "keep the stomach down" by waist constriction. This statement is made upon the strength of hundreds of exact tracings of the outline of the body made by the writer, and may be verified by any one who will take the trouble to look through a collection of photographs or engravings representing the women of barbarous tribes in a semi-nude condition.

2. The measurement of many hundreds of women of various nationalities,—English, French, German, American, Chinese, East Indian, American Indian, Mexican, and Italian,— has afforded the most convincing evidence that the small waist of the half-civilized woman is an abnormality, really a deformity, and as unnatural as it is ugly and ungraceful. A nude figure with a wasp waist would be condemned as a monstrosity, even by the most ardent worshiper of fashion. It is only when draped that the small-waisted woman can by any stretch of the imagination be thought to look well. Underneath the drapery of the small-waisted woman is hidden a figure which is positively hideous in its departures from the normal outlines. The collapsed waist, rounded shoulders, protruding belly, and crooked spine of the undressed devotee of fashion who comes to the gynecologist and the orthopedist for repairs, if drawn to life and presented in a comic paper, would surely be pronounced a caricature, and such it truly is. The beautiful proportions of the Venus de Milo, universally conceded to be the finest model of a mature woman's figure which art has ever produced, presents a waist, the circumference of which is exactly 47.6 per cent of the height, little less than the chest measurement taken at the armpits. Prof. Giovanni, of Milan, has shown the natural chest measurement to be just one half the height.

In the careful measurement of 600 adult civilized American women, we found the average height to be 62.6 inches. The average waist measurement in 848 women was 24 inches, or 38.4 per cent of the height.

Dr. M. Anna Wood, director of the Department of Physical Training in Wellesley College, Mass., found the average height of 1500 young women to be 63.2 inches, and the average waist measurement to be 24.6 inches, or 38.9 per cent of the height. We found the proportion of waist to height among unmarried French women from eighteen to thirty years of age, to be 45.4 inches.

Dr. Seaver, of Yale, found the average waist measure of 2000 men to be 29.3 inches, which, compared with the average height — 68.6 inches,— gives a waist proportion of 42.7, nearly three per cent less than that of French women, and five per cent less than that of the Venus de Milo.

1 1. "Experimental Researches Respecting the Relation of Dress to the Pelvic Diseases of Women." 1889.

2. "The Value of Exercise as a Therapeutic Means in the Treatment of the Pelvic Diseases of Women." 1890.

3. "The Influence of Dress in Producing the Physical Decadence of American Women." 1891.

4. "The Relation of Static Disturbances to the Displacements of the Abdominal Viscera. 1892.

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We have taken the pains to note the proportion of waist to height in a number of women who seemed to have the most perfect proportions, and have always found it to approximate closely to that of the Venus de Milo.

Some of our readers may remember the marvelous agility and grace exhibited by Buffalo Bess, who rode, bareback, the wild buffalo in Buffalo Bill's Wild West show. Certainly any woman might be proud of the wonderfully agile and graceful figure possessed by this young woman. We recently had an opportunity to take the measurements of her figure, and found them to be as follows: Height, 61.5 inches; stretch of arms, 63 inches (allowing for shortening of left arm, occasioned by an injury); chest at level of armpits, 33.5 inches; hips, 37.5 inches; waist, 28.8 inches; giving a waist proportion of 46.8, a very close approach to the proportions of the Venus de Milo.

This young woman's profession rendered waist constriction by tight corsets or waistbands impossible, hence the abdominal muscles had an opportunity for the freest and fullest development. At the time these measurements were taken, she was, as she stated, rather thin in flesh, as she was just recovering from a recent illness due to hardship and exposure. There was certainly no superfluous adipose tissue about the abdomen. Although she had followed for years a profession which involved the most violent physical exercise, suffering frequent falls, and being once trampled upon and nearly killed by the wild beast she rode, the pelvic organs had never suffered any injury thereby. How absurd, then, to charge upon such gentle exercise as walking up one or two flights of stairs, or lifting a baby, or running a sewing machine, the little health of women, and especially that long list of congestions, inflammations, catarrhs, displacements, hyperæsthesias, etc., which constitute the chief support of a large share of the profession, and render miserable the lives of so many thousands of American women.

If all physicans would join in a vigorous condemnation of the conventional mode of dress which requires waist hampering and constriction, the American woman might be induced to stop long enough to consider well the consequences, before proceeding farther in the work of destroying, for herself and for her posterity, the beauty, grace, and vigor which accompany the natural and well-developed waist. J. H. K.

The Mighty Fallen.— John L. Sullivan is said to be a paralytic. For many years, until recently, he has been the champion pugilist of the world. His Herculean frame and enormous muscles have been long thought to be invincible, and he himself has had such confidence in his constitutional powers that he has not hesitated to plunge into every possible form of dissipation, in the intervals between the periods of training to which he has now and then subjected himself in preparation for a contest with some rival. This perpetual soaking of his body in alcohol, however, has not failed to do its work of insidious mischief, even upon the iron frame of the great champion; and to-day, while a giant in appearance, and with his muscles as large as ever, his strength has departed, never to return. The muscular fibers, under the influence of the alcohol, have taken on that peculiar form of degeneration by which the fibrillæ are displaced by the connective tissue elements, so that while they are as large and hard as ever, perhaps even more dense, they are almost powerless. In his last contest, Sullivan found himself so thoroughly unable to command the ponderous muscle which had won for him so many victories, that he insisted that he had been drugged. In this he was entirely correct,— he had been drugged, not by his antagonist, however, nor by an enemy, but by himself.

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For many years the foes of temperance have pointed to Sullivan as an evidence of the harmlessness of alcoholic beverages and the falsity of the statements made by the temperance agitators respecting the influence of alcohol upon the muscles. To-day, Sullivan stands before the world a pitiful object lesson of the dreadful effects of alcohol, and a complete demonstration of the ability of this poisonous drug to break down the most vigorous constitution, paralyze the strongest muscles, and even ruin the most magnificent physique. J. H. K.

Umbilical Erysipelas and Tetanus in the Newborn.— We still see notices of the occurrence of these two diseases in the medical press, and not infrequently such cases are brought to our notice in a practical way. It seems to us that if these diseases were thoroughly understood by every physician, neither of them would ever occur again. In the hands of those who do realize their causes, it is seldom that they make their appearance.

Erysipelas is undoubtedly due to bacteria of a well-known character,—a streptococcus, without which this malady will not develop, and without the products of which the lesions will not appear.

As to tetanus, it has been well proven that it is due to micro-organisms, which also produce a septic material capable of causing tetanic contractions. Both of these germs, in the cases we have in view, are introduced into the system by lesions of the umbilicus or through the unbilical cord in the newborn. It is only necessary to know this fact in order to realize the necessity of applying prophylactic measures to prevent the diseases in question. Both of them are infectious, but infection may be absolutely prevented by thorough cleanliness, or asepsis. It is time that physicians who are behind in the study of bacteriology should take a hint of the truth, and study up on this and other microbic affections. P. P.

REVIEWS.

Addresses and Essays.— By Frank Lydston, M. D. Published by Renz and Henry, Louisville, Ky.

This little volume consists of fifteen important and excellent essays by this well-known author and physician. It is a book of merit which will materially increase the value of any library. The thoughts are largely original, and of much practical utility. All the essays will be read with interest, particularly those on "Aberrant Sexual Differentiation," "Studies of Criminal Crania," "Materialism *vs.* Sentiment in the Study of Crime," and "Sexual Perversion." The other essays are chiefly on some subject of genito-urinary surgery, and are all good.

The American Microscopical Society.— We have received a special circular referring to the Fifteenth Annual Meeting of the American Microscopical Society, in which the writer has been interested since its organization. The list of papers presented at the meeting includes a large number of highly interesting scientific dissertations on questions of an eminently practical character, as well as those of technical value. A large number of new and valuable microscopical appliances and accessories were exhibited. A question was raised whether it would not be wise to hold the meetings of the Society at the same time and place as the American Society for the Advancement of Science. The fact that many of the members of each Society are also members of both Societies would seem to indicate the wisdom of this suggestion. The American Microscopical Society has done much to place the science of microscopy in this country upon a footing with the work done by microscopists of England and continental Europe, and we are pleased to note that the Society seems to be in a flourishing condition.

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THE LABORATORY OF HYGIENE.

(SANITARIUM.)

J. H. KELLOGG, M. D., SUPERINTENDENT.

MONTHLY BULLETIN.

BATTLE CREEK, MICH., JANUARY, 1893.

GRAPHIC STUDIES OF THE SINUSOIDAL AND OTHER FORMS OF ELECTRICAL CURRENTS.

TEN years ago, I began a series of experiments with electrical apparatus of various kinds, for the purpose of determining the physiological and therapeutical effects of the electrical currents produced by different forms of apparatus. In the course of these experiments, a peculiarly constructed magneto-electrical apparatus was secured, and the current produced by it tested. The current produced by the machine being too powerful for ordinary use in applications to the human body, and possessing so high a tension that the ordinary water rheostat was quite insufficient to control it, I constructed a water rheostat by means of a narrow glass tube three or four feet in length. I soon discovered that this current possessed qualities of a remarkable character, which I was very glad to utilize, especially in the treatment of certain classes of gynecological patients.

In a paper entitled, "Report of Forty-eight Cases of Alexander's Operation," read before the section on Gynecology, at the thirty-ninth annual meeting of the American Medical Association, in May, 1888, and published in the proceedings of the Association for that year, I described the current used and its action as follows: —

"I have employed different forms of currents,— the faradic current, the slowly interrupted galvanic current, the galvanic and faradic currents combined, and the dynamic current. The latter, which is supplied by a small machine giving a reversing current, I have found the most effective of all means of stimulating contraction in the muscular structures which support the uterus. When one electrode is placed upon the abdomen and the other in the vagina, energetic and *painless* contractions are produced in the abdominal muscles, the sphincter muscles of the rectum and vagina, and the other muscular structures within the pelvic cavity. Experiments made with this current on a patient under ether and with the round ligaments exposed and isolated, showed contraction of these structures also, when the electrodes were applied as indicated. If it be true, as has been suggested, that other ligaments of the uterus as well as the round ligaments, are to a considerable degree muscular in their structure, I deem it wholly probable that these also participate in the contraction. These contractions occur at every reversal of the current, so that this current not only has the effect to stimulate nutritive changes in the diseased structures, but also affords a most valuable means of securing functional activity in idle and relaxed parts, thus giving them the benefit of a genuine gymnastic exercise. The therapeutic results following the use of this current, justify me in claiming for it a decided superiority over any other form of electrical current for this purpose. I have used this current for medical purposes for the last five years."

The effects of the current produced by these machines, were also described in a

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paper upon the function of the round ligaments, presented before the American Association of Obstetricians and Gynecologists, at its annual meeting for 1889.

I have continued the use of this current, and, within the last two years especially, have subjected it to careful study, and find it to be identical with the so-called sinusoidal current recently described by M. D'Arsonval. My attention was first called to this fact by an article published by D'Arsonval in the *Archives de Physiologie* for January, 1892, with which he showed a graphic representation of the form of electrical current furnished by his sinusoidal apparatus, in contrast with the current produced by ordinary magneto-electric machines. In Figs. 1, 2, and 3, I reproduce the tracings published by D'Arsonval, which represent different electrical currents as follows: —

Fig. 1 shows the alternating current of a medical magneto-electric machine. The horizontal line indicates the neutral, or zero, point. That portion of the curve above the line, represents the waxing and waning of the current in one direction, the portion of the curve below the line representing the current while passing in the opposite direction.

Fig. 2 represents the current produced by the same machine imperfectly commutated.

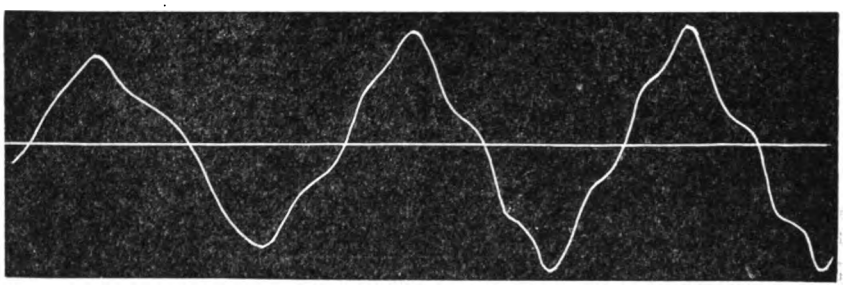

Fig. 1.

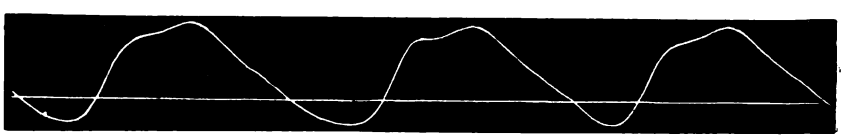

Fig. 2.

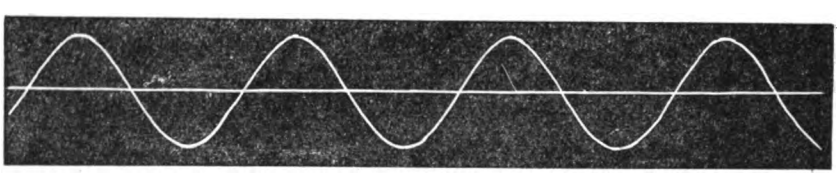

Fig. 3.

Fig. 4.

In Fig. 3 is shown the perfectly uniform curves of the sinusoidal current. The curves in this figure represent a current which varies uniformly, increasing from zero to maximum, and decreasing to zero again, first in one direction, then in the other. The change in the direction of the current is made at the zero point, and the increase and decrease in the intensity of the current is absolutely uni-

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form, as shown by the beautiful regularity of the curves.

D'Arsonval has shown that the motor

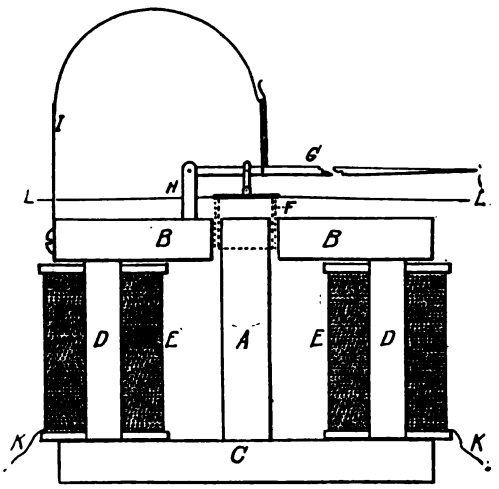

FIG. 5. DIAGRAM OF A NEW FORM OF ELECTROGRAPH.

and sensory effects produced at a given point, are always proportionate to the variation of the potential at the point excited. It cannot be disputed that important physiological significance must attach to the *mode* of variation in the potential, as well as to the *amount* of variation, although the latter consideration seems to have received very little attention.

Although recognizing the peculiarity of the current which I had discovered, and continuing to utilize its therapeutic properties with advantage, I was at a loss to understand the reason for its peculiar qualities. Information was sought from the manufacturers of the instrument, but they could throw no light upon the question. The interesting results obtained by M. D'Arsonval with the graphic method, led me to undertake the same mode of investigation, and I accordingly constructed an electrograph by attaching a writing lever to the solenoid of a large and very delicate galvanometer, in such a way as to describe upon the smoked surface of a rotating cylinder the slightest movement of the solenoid. By this means I obtained from my machine the curve shown n Fig. 4. This arrangement, however, proved inconvenient, being too cumbersome, and not sufficiently delicate to test the currents of faradic machines and other rapidly alternating currents. I accordingly had constructed by the electrician of the Sanitarium, Mr. H. A. Dow, an apparatus for recording the form of alternating or variable electrical currents, of which the following is a brief description: —

A, B, C, and D, Fig. 5, represent the several portions of a soft iron frame. On the two arms, D and E, are mounted two solenoids (E, E), each wound with 106 feet of copper wire of the diameter .032 inches. The two solenoids are connected, and the terminals (K, K), when the instrument is in use, are connected with the poles of the battery, thus producing an electro-magnet, of which A constitutes one pole, and B, B, the other. The arm A is cylindrical in form, and the terminals B, B, are semicircular at their ends, so as almost completely to embrace the arm A, thus producing an annular magnetic field. A small solenoid composed of 10.5 feet of very fine copper wire (.005 inches in diameter) is placed at F. The current to be tested is passed through this solenoid by making proper connections with the terminals (L, L).

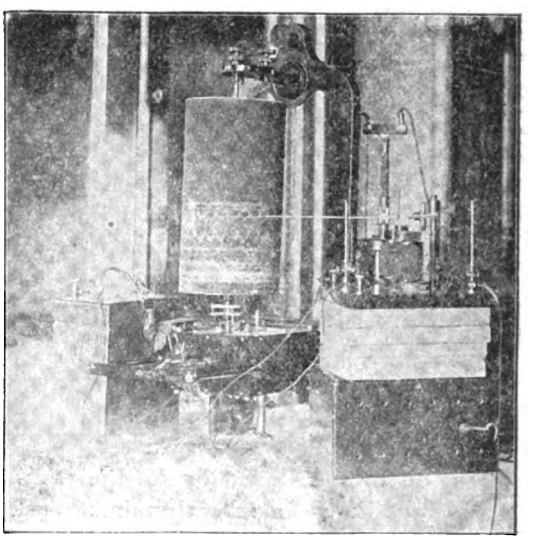

FIG. 6. ELECTROGRAPH ARRANGED FOR MAKING A TRACING.

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When a current is passing through solenoids E, E, thus producing a magnetic field about the solenoid F, a current flowing in one direction through F, would cause it to be lifted up, while a current passing in the opposite direction would cause it to drop down below the level to which it is held by the spring I. The writing-arm G is attached at one end to the brass post H, the other end being free. A small standard connects it with the solenoid F, which, acting upon the short arm of the lever, produces, even with a very slight movement of the solenoid, a considerable movement of the long bamboo lever, the free end of which rests against the smoked surface of a revolving cylinder.

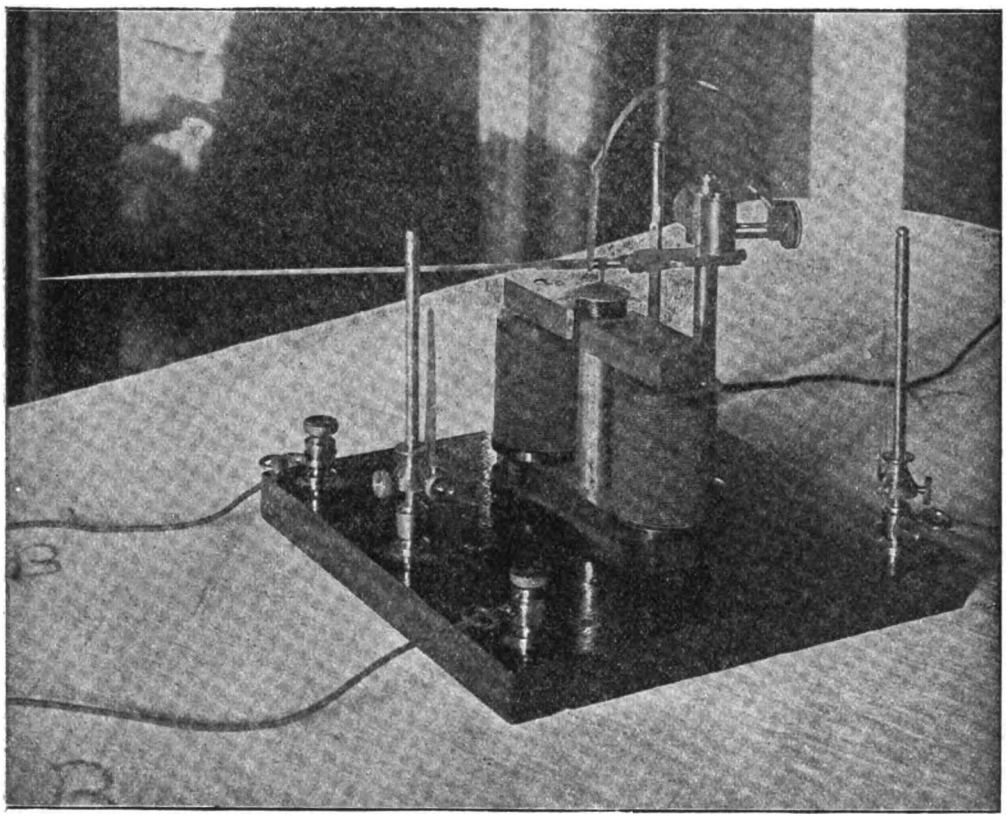

FIG. 7. ELECTROGRAPH.

This instrument is constructed somewhat on the plan used by M. D'Arsonval, but differs in several points most fundamentally in the method by which the writing-arm is actuated. By means of a mechanism not shown in the diagram, but shown in part in the photo-reproduction presented in Figs. 6 and 7, the position of the solenoid in a vertical plane could be easily varied by a screw adjustment. Lateral movement of the solenoid is prevented by suspending it from the upper extremities of three delicate springs placed vertically at about three inches from it, and at equal distances from each other. By means of this device, the most delicate variations in an electrical current may be instantly recognized and recorded by means of a kymographion, in the same way in which tracings are taken from a recording tambour.

By means of this instrument, I have taken a large number of tracings of different forms of electrical currents. Being especially interested in the sinusoidal current, I naturally first gave my atten-

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tion to this, and obtained the beautiful tracing shown in Fig. 8. This curve seems to be even more distinctly sinusoidal in character than that taken by D'Arsonval, shown in Fig. 3. In Fig. 9 is shown a tracing obtained from another magneto-electric apparatus which does not produce a perfect sinusoidal current. The variations of this current, while not the same, are similar to those of the machine studied by D'Arsonval, shown in Fig. 1.

Some of the special qualities of this current were thus stated by the writer in a paper read at the annual meeting of the American Electro-Therapeutic Association held at the Academy of Medicine, New York, Oct. 4–6, 1892 :—

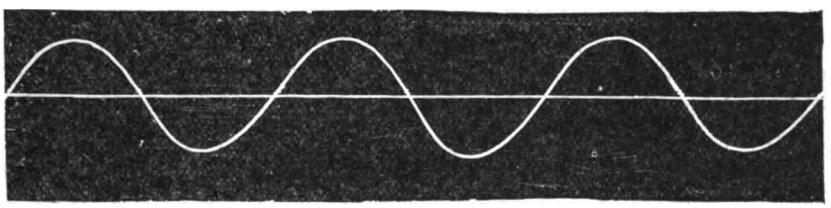

FIG. 8. PHOTO-REPRODUCTION OF ELECTROGRAPHIC TRACING OF SINUSOIDAL CURRENT

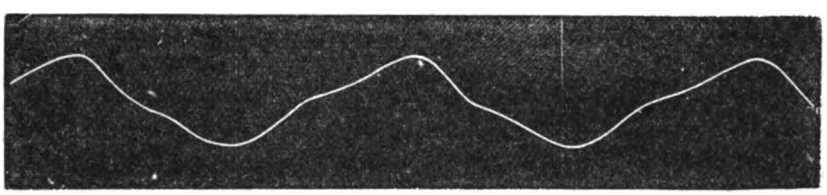

FIG. 9. TRACING OBTAINED FROM A MAGNETO-ELECTRIC MACHINE NOT SINUSOIDAL IN CHARACTER.

"The two special and most important characteristics of this current, to which the term sinusoidal has been very appropriately applied by D'Arsonval, are (1) its comparative painlessness, and (2) its great penetrating power.

"*Motor Effects.*— When an ordinary sponge electrode connected with the machine is placed in each hand and firmly grasped, and the machine made to rotate slowly, vigorous contractions occur in each arm in alternation, in which all the muscles of the arm seem to participate. Placing one electrode in contact with the feet, and grasping the other between the two hands, the muscles of both limbs are thrown into most vigorous muscular contraction. There is no tetanic contraction, however, as in the employment of the faradic current, and absolutely no other sensation than that of motion, unless the current is made so strong that pain is induced by the violence of the muscular movement itself. With one pole placed in the vagina and the other upon the abdomen, and with the proper adjustment of the vaginal electrode, the muscles of the abdomen and of the thigh of one side or both thighs in case my divided pole vaginal electrode is employed, may be induced without other sensation than that of motion. The patient suffers no inconvenience whatever from the application of a current sufficiently strong to throw into vigorous action all the voluntary muscles of the lower abdomen, pelvis, and upper thighs.

"I have noted a number of motor points in the pelvis by pressing the electrode upon them, by which most powerful and extensive muscular contractions may be induced. I have often seen a patient lying upon the office table, with the muscles contracting so vigorously under the influence of the current as to shake the table violently, and yet experiencing no unpleasant sensation whatever. Applied

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to the interior of the stomach by means of a suitable electrode passed through a stomach tube, the current induces strong muscular contractions that can be easily distinguished. An induced current capable of producing equally strong contractions, is so painful as to be almost intolerable. The same is still more emphatically true of contractions produced by the induced current obtained by the Leyden jars of a static electrical machine, with the discharging rods placed near together, producing the so-called Morton current.

"As a means of exercising the muscles, especially muscles the action of which cannot easily be isolated in voluntary action, as is the case with many of the muscles of the trunk, and in cases of paralysis in which degenerative changes are not far advanced, this current certainly affords a method superior to all others. It is also of great service as a means of passive exercise in connection with rest cure, encouraging tissue renovation and reconstructive action much more efficiently than massage, which, however, may be employed to excellent advantage in connection with it. The impression made upon the patient, who sees his muscles in vigorous action without feeling the slightest prickling, cramping, or other unpleasant sensation, is of the happiest kind, especially in persons who have previously been 'shocked' by the clumsy use of the electrical current, or unavoidably through the employment of ordinary faradic apparatus."

In cases of facial paralysis, this current affords an admirable means of exercising the muscles and stimulating the nutrition of the paralyzed structures, as one can pick out the affected muscles and put them into rhythmical action with very great facility. In the treatment of spinal curvatures due to weakness of the muscles of one side, or irregularities of muscular development, this current is also invaluable. With one pole applied to the feet and the other to the two hands, vigorous movements affecting nearly all the muscles of both extremities, are easily produced. The current affects involuntary as well as voluntary muscles. It is of great service in a case of constipation, one pole being applied to the rectum and the other to the abdominal muscles. It serves a double purpose in cases of this kind, awakening the vital activities of the rectum, and at the same time rapidly increasing the strength and efficiency of the abdominal muscles.

I have also found it of great service in cases of dilatation of the stomach. By means of a stomach electrode, which I have had constructed for the purpose, with one pole applied internally, the other externally, vigorous contractions are readily produced. I have verified this in several ways. After the current is turned on, one can easily detect the active peristaltic movement by listening over the region of the stomach with a stethoscope. The most positive evidence is afforded, however, by the fact that the stomach diminishes in size. I have sometimes noted an upward movement of the lower border of the stomach during a single treatment, amounting to fully two inches. No painful sensation is produced by the current, even when quite strong. I have, in some instances, increased the strength of the current sufficiently to enable me to obtain the most indubitable evidence of contraction of the organ in the forcing out of the stomach contents through the tube, or along the side of the tube containing the electrode. This effect is always produced when the current is made sufficiently great. The ejection of the stomach contents is not accompanied by nausea, and ceases the instant the strength of the current is lessened, beginning again when the current is increased. I have used this current to the most excellent advantage in many cases of insufficiency of the stomach, with and without dilatation.

(To be continued.)

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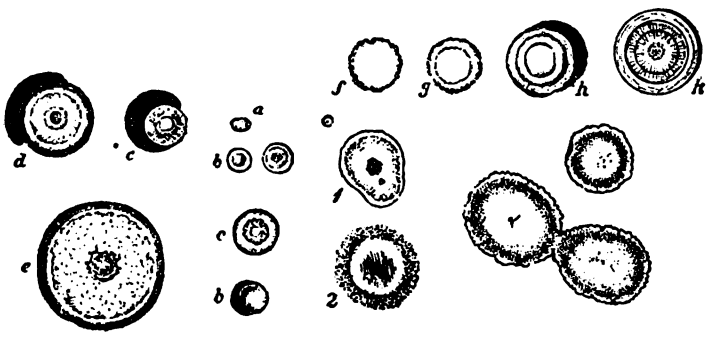

Fig. 1.

Fig. 3.

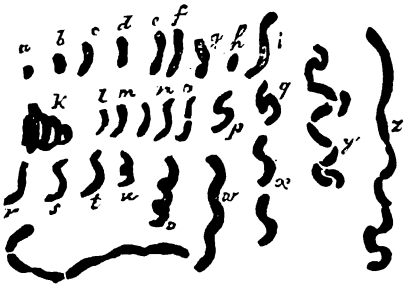

Fig. 2.

Fig. 4.

Fig. 6.

THE COMMA BACILLUS.

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MODERN MEDICINE

AND

BACTERIOLOGICAL WORLD.

VOL. II. BATTLE CREEK, MICH., U. S. A., FEBRUARY, 1893. NO. 2.

ORIGINAL ARTICLES.

CONCERNING CHOLERA.

BY PAUL PAQUIN, M. D.

(Illustrations in Frontispiece.)

So much is being said and printed now about cholera, that physicians, in view, of the possibility of its appearance in this country next spring, are all very anxious to inform themselves as much as possible on the most recent discoveries concerning it. It may not be amiss, therefore, to publish at this time, some notes on the most important points concerning its cause, development, and treatment.

At the outset, it is well to bear in mind that Asiatic cholera is, as the medical profession well knows, endemic in India, and reaches Europe usually by way of Egypt. It never arises spontaneously in Europe or America.

As far back as 1848, the parasitic nature of cholera was suspected. In that year Virchow, and in the next year Pouchet and Swayne, found vibrios in abundance in the dejections of choleric patients, without attributing to them any specific action. From that time until the discovery of the comma bacillus by Koch, numerous investigations were made without definite results. In 1884 Koch became positive that cholera was due to this parasite, which he termed the comma bacillus because of its peculiar curved appearance, something the shape of a comma.

The definition of Asiatic cholera may be given as follows: An essentially infectious disease, apparently contagious under certain circumstances, and epidemic. It may or may not be attended by premonitory diarrhœa; its invasion is sudden, accompanied by copious evacuations, vomiting, diarrhœa, cramps, and algidity, which frequently end in death, or in a reaction in which various symptomatic manifestations occur, followed by recovery or death. It must not be confounded with cholera nostras or cholera morbus, which sometimes present many of the foregoing characteristics, but which are produced without the comma bacillus, by different micro-organisms. These other organisms appear and do mischief in certain seasons, contrary to the Asiatic cholera, which may appear with more or less violence at any time of the year. It is modified but not destroyed by low temperature.

The Germ of Cholera.—As we have mentioned, the comma bacillus of Koch is the parasite which produces cholera. It is found in the inodorous aqueous liquid dejections in which float whitish riziform grains. The comma bacillus is almost always present in these particles.

The bacteria can be demonstrated by spreading on a cover-glass a fragment of riziform particle, allowing it to dry, and then coloring it a few seconds with methyl-violet or methyl-blue. The preparation is washed and examined with an immersion objective and an Abbe condensor. This method, however, shows numerous other bacteria, among which it may be difficult to discover the comma bacilli. To find these bacilli in large quantities, it is necessary to study a case very rapidly in the earliest stage, when they may be as plentiful as in a new, pure culture.

The best means of seeing these parasites in liquid fæcal matters containing many, is to spread a bit of a small mucous particle on a glass slide, allow it to half dry, and then cover it with a few drops of weak solution of methyl-violet

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(6 B) in distilled water. A cover-glass is applied, and pressed down with bibulous paper. The preparation is then examined with a high power objective, dry or in immersion. The bacilli are found still alive, though stained; they are very active, and retain their movements for some time.

This mode of preparation, say Cornil and Babes, is better for a delicate examination than a complete desiccation with coloration and mounting in Canada balsam. It is well established that during and by manipulation and dehydration, the bacteria of cholera contract, as do most other bacteria under the same influences. The result is that they decrease in size, while their movements are of course completely destroyed.

The average comma bacillus is about $1\mu,5$ to $2\mu,5$ in length by $0\mu,5$ to $0\mu,6$ in thickness. The germs are well named, "like a comma;" their sides are smooth and their extremities either blunt or a little pointed and thickened. They are not so long, but broader than the bacilli of tuberculosis. Occasionally two rods are observed end to end, in such a shape that the two united form the letter S. They are perhaps the most characteristic of the comma bacilli. (See Figs. 2 and 3, frontispiece.)

After the second or third day of cholera, when the period of reaction begins, the comma bacilli are scarce, and stained by bile; it is then difficult to see them, and it is sometimes necessary to make cultures if we wish to ascertain their presence. After a long period it would be difficult, if not impossible, even by cultures, to ascertain if they were present, because at the beginning of the period of recovery they disappear, and soon they are entirely absent. In rapid cases, however, in which death occurs, the germs may be cultivated from the fæces immediately after death. The secondary lesions which are found on the mucous membrane of the intestines, etc., such as ulceration and gangrene, are attended by a development of numerous bacteria of decomposition, which eventually destroy the bacilli of cholera. This point should not be forgotten in making investigations.

Numerous methods of growing cultures have been recommended for this germ, as for other microbes; but for practical use the two following seem to have given the most satisfaction: —

The first consists in inoculating one tube of liquefied gelatine with a platinum wire. This tube is shaken, and from it a second inoculation is made in a second tube with a curved platinum wire, using three drops for inoculating material; the second tube is shaken and mixed as the first. Five drops are then taken from this tube and mixed with the liquid gelatine of a third one. The contents of each tube are then poured on three plates superposed, the first of which should be the inferior one.

The second method consists of taking a few riziform particles of the fæces, mixing them well with liquid gelatine, and making from this some gelatine solutions by Koch's method, *i. e.*, successive solutions with 1, 3, 5, and 10 drops. These different culture solutions are poured on plates. The development is allowed to progress for two or three days, during which colonies of microbes may appear on the first plate as slight liquefied spots. They may be plain enough on some or all after two or three days. The colonies may be scarce or numerous; of course they are more numerous in the more concentrated of the culture solutions.

Another series of similar dilutions is then made, by using a little taken from the liquefied spots. The substance may also be cultivated in beef broth at the temperature of the body. If it contains any cholera bacilli, they will develop on the surface in the form of a white scum.

In examining with a magnifying glass or microscope at 55 diameters, 24 hours after sowing a plate of gelatine, the colony of bacilli may be recognized by the following characteristics, which we quote word for word from Cornil and Babes's writings: —

"In the center of the colony there exists a spot as if formed by a mass of dust surrounded by a granulous circle, and a second circle clear and nongranulous. (See Fig. 1.) Between the center and the first circle the gelatine is liquefied. These cultures have a yellowish appearance: they are more transparent than most of the cultures of the germs of the fæces. The other bacteria of the fæces usually form larger colonies, round, dark, and brown, which do not liquefy gelatine. We have found twice, among the bacilli of cholera, some other curved microbes, which are described in our clas-

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sification. One of the microbes found, liquefies gelatine, more slowly, however, than the comma bacillus, and it is distinguishable from it because it is not curved or motile.

"If the colonies of the cholera bacillus are very close to one another, they soon become united, and give rise to irregular figures. The gelatine is liquefied, and in this liquid zone swim little opaque flakes.

"In order to isolate this bacterium, it is necessary to take material from the center, magnifying the colony to 50 diameters for that purpose. A slight particle taken from this spot with a sterilized platinum needle, is transferred to a gelatine or agar-agar tube. Two days later a grayish mass may be seen in the gelatine; it is transparent, its surface is somewhat concave, granulous, and conical, with the point directed toward the bottom of the tube; in other cases it penetrates into the gelatine in the form of whitish prolongations. Liquefaction takes place slowly, but a considerable quantity of it is present after a few days. The liquid portion is somewhat milky and granulous at its lower part, and in the full development of the culture its liquid portion is all whitish and opaque. A distinguishing point between the liquefied action of the comma bacillus and that of other bacteria on liquid gelatine, is, that in the former the gelatine beneath the puncture of the inoculation remains solid for a long time, while almost every other liquefying bacteria liquefy the gelatine in a few days in the form of a sack. Generally speaking, the bacillus of cholera liquefies gelatine much more slowly than any other bacteria perhaps, for it takes at least one week to liquefy a tube completely."

If a gelatine culture medium of 10 per cent is used, a characteristic point worthy of notice presents itself: It is the reaction of the gelatine in the form of an air bubble. In less concentrated gelatine, or in a culture exposed to a higher temperature, the gelatine liquefies it sooner in the form of a sack.

In liquefied gelatine the culture examined is found to contain very motile bacilli. They may be studied by placing a small drop of the liquid with a platinum wire on a cover-glass, placed on the excavation of a glass slip containing a drop of a very weak solution of methyl-violet (1 to 2000). The edges of the cover-glass should be smeared with oil or vaseline, to prevent evaporation. Microscopic examination should be made at once. The germs take on coloration this way without dying. Their movements are very rapid, and they may be seen at an ordinary temperature. The movements consist chiefly in oscillations more or less analogous to those of spermatozoids. "The curved bacilli contract by bringing the two curved extremities together, and diminish their curvature in turning." The culture begins to show germs inclined to curvature of the adult form, after 10 hours. The curvature comes gradually as the culture grows older. The forms of the germs in the cultures as well as in the dilute liquids may vary according to age and circumstances, from almost straight rods in the beginning to spiral shaped bacteria in old cases. (See Fig. 2.) The spiral forms are similar to several bacteria, but are chained together by the extremities, giving the appearance of several s's end to end.

The Vitality of the Comma Bacilli.—The comma bacilli are aërobic, and may live on and in other substances than the material of the alimentary canal and the ordinary culture media. It has been established that they grow easily on damp clothing, and in milk without altering its color, aspect, etc. They also grow at the temperature of the body on cooked potato, on which they appear in the form of a grayish-colored coat. These germs have also been cultivated with success on meat, in broth, on carrots, cabbages, moist bread, eggs, cheese, and in sweet water. The best temperature for their growth is 186° to 104° F., but they multiply very well on gelatine at 68° F. They do not grow below 60° F. They do not die, however; in fact, they preserve their first vitality. Cold weather even, does not destroy them, for they remain alive at a temperature below the freezing point, although they are inactive.

The germs thus preserved may exhibit their vitality again at an ordinary temperature, either in cultures, moist clothing, or in specimens of earth. Indeed, under such circumstances they may multiply so rapidly as to predominate over other germs. They are usually destroyed, however, two or three days afterward, by the action of other bacteria growing with them. This is probably what takes place, in this malady, in the fæces, on the sur-

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face of the intestines where the bacilli of cholera disappear entirely in a few days after the attack. It is established that even when the small intestine is inflamed and dispossessed of its epithelium, and covered more or less with blood from capillary hemorrhages, the germs of putrefaction flourish, and the symptoms that result are analogous to intoxication by septicæmia.

Cholera germs were successfully cultivated while exposed the whole winter to the temperature of the exterior air at Berlin, being renewed from time to time. The best days possible were chosen for this operation. This demonstrates that it is possible for these germs to pass the winter alive, provided it occurs in conditions offering sufficient nutrition.

On the other hand, the comma bacilli stand the heat pretty well for several days; 112° to 113° F., for instance, does not effect them until after a very long time, but they were killed at 122° F. in a very few days. Cultures heated slowly to about 147° F. or very rapidly to about 167°, soon become sterile.

In water they may live a certain time, but water as a rule contains no substance capable of nourishing them sufficiently, and as a result they soon perish. Of course this does not apply to stagnant water containing organic matters, nor does it apply to water of rivers which are fed by rich deposits of organic substances from the banks and small streams from the country. Such waters make very nutritive places for the accumulation of germs of many kinds, including probably the comma bacillus. The germs may live in ordinary drinking water several days, but in distilled water they die in twelve hours. Seltz water kills them in a day. Koch claims that most acids are deadly to them, but that they can live in contact with a few of them. He says that the acids of the gastric juice are deadly to them, till they reach the alimentary canal; if Koch's theory is correct, it must be that to reach the bowels they pass the stomach in a large quantity of liquid or in solid material, being thus protected by the mixture and dilution, and not stopping sufficiently long to come in contact with the gastric juice.

Various substances have been tried with a view to destroying the comma bacillus, and it was found that vegetation was arrested or prevented by the following substances in the proportions indicated: Alum, at 1 to 100; camphor, 1 to 300; carbonic acid, 1 to 400; essence of mint, 1 to 2000; sulphate of copper, 1 to 25,000; quinine, 1 to 5000; corrosive sublimate, 1 to 100,000.

Other experimentalists put the figures as follows: Corrosive sublimate, 1 to 20,000; carbonic acid, 1 to 1000; sulphate of copper, 1 to 3000 to 1 to 5000; salicylic acid, 1 to 800 to 1 to 900; thymol, 1 to 900 to 1 to 10,000; iodine, 1 to 500; bromine, 1 to 600; alcohol, 1 to 15; quinine, 1 to 800; and acetic acid, 1 to 2000.

Desiccation is also deadly to the comma bacillus. Koch found that choleric fæces spread on linen and allowed to dry a few hours to a few days, destroyed the life of the cholera germs. Dejections buried in the ground and then dried at the surface of damp or dry earth, furnished dead comma bacilli. It is believed, therefore, that this parasite does not possess spores capable of resisting such influences and living for years in a latent condition, as do spores of charbon, for instance. From Koch's experiments, desiccation of infected objects would be a very practical and safe mode of disinfection.

The vital action of other microbes is another mode of destruction of the comma bacillus. Several kinds interfere with rapid multiplication, if they do not actually stop the growth of this microbe.

Experimental Cholera.— The general phenomena of cholera are explained by two theories, both of which seem correct. The first theory is that the comma bacillus produces very rapidly some local intestinal lesions, and possibly some toxic substances, conditions which are attended with certain serious local and general disturbances, and sometimes death; the second theory is that septic microbes produce powerful septic agents, and complicate the cholera infection at an early period, resulting in the paralysis of the walls of the bloodvessels and other most serious sapremic, or septic, phenomena. All the lesions and symptoms of cholera seem to depend directly or indirectly on these two far-reaching factors. The observations and experiments of the most conscientious and accurate investigators and practitioners seem to support these views. The production of experimental cholera was the only link necessary to complete the evidence against the

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suspected specific germs causing the various complications which are a part of cholera. This has been done to some degree of satisfaction. Guinea-pigs and other small animals have been infected, and the disease has been studied in its various stages, both in rapid and slow cases.

Pathology of Cholera.— (Figs. 4 and 5, representing sections of intestine.) Just a few words on this point. I had not intended to touch on it at all, but it is of value in demonstrating the truth of several preceding statements.

The chief microscopic lesions are: A special mucous condition of the peritoneum; severe congestion of the intestines, which have a peculiar roseate color; a creamy serous liquid in the mucous surface of the intestines; pronounced congestion of the vessels of the periphery of the glands of Peyer in ordinary cases; often swelling and ulceration of the follicles. The creamy liquid consists chiefly of disintegrated cells of the epithelium of the intestinal villosites.

The fæcal matters are odorless, or emit a flat smell; they consist of watery matter in which float many grayish or whitish flakes — riziform grains which form a deposit in the bottom of the vessel, leaving the upper portion barely clouded. They are neutral or slightly alkaline. In the first and sometimes the second day there is no bile in the fæces. The biliary and urinary secretions seem to be suspended during the period of algidity.

Microscopically, the liquid of the fæces and the intestinal surface contains numerous mortified, loose epithelial cells, "cylindrical, or tumefied, or granulous, or hyaline."

The lower part of the ileum is usually the most affected, and in that region may be found the comma bacilli in the greatest quantities. It seems that the liquid substances ingested carry the germs to this point. The comma bacilli penetrate through the villosities into the layers of the mucous membrane, the glands, and the connective tissue, as may be seen in proper sections. The microscope has demonstrated numerous comma bacilli in the first stages of the cultures; in the second, many other germs are seen with them; and at a certain moment, these invading microbes predominate, and arrest the growth of the comma bacillus, as stated above. Among these microbes was found a curved individual resembling the comma bacillus, but easily distinguished from it. Another resembles the staphyloccocus aureus, and is pathogenous to mice and probably to man.

Technique.— This has been touched upon in the foregoing explanations. It is easy to stain fresh comma bacilli, particularly if 24-hour cultures of a moist chamber are used. The germs are dried slightly on cover-glasses, and stained with a weak solution of methyl-violet. After complete desiccation, the germs resist the stain, and on the other hand they are contracted and appear smaller; it is then difficult to determine their structure. If it is desired to color dried germs, it is necessary to place them in an aqueous solution of anilized fuchsin slightly alkaline, and place the whole in a damp chamber covered with a glass bell. They should be mounted in Canada balsam.

Sections are stained in the same manner, but it is preferable to heat the fuchsin bath. After coloration, wash in distilled water slightly acidulated with acetic acid; dehydrate in alcohol, and mount in balsam.

Etiology.— Various authors have given it as their opinion that cholera is transferred chiefly through water. This is, however, not exactly supported by the history of the various epidemics of the past. It is true that the fæces and soiled clothing of choleric patients may infect water, which in turn may, under favorable circumstances, infect people; but pure water, as has been said before, is not a very favorable medium for the growth and dissemination of the malady among human beings.

Another idea is that dried substances containing germs of cholera may be transferred from place to place and then produce infection. This cannot be a common cause, since desiccation means death to these parasites. It is man himself that is the chief medium for the propagation of cholera, notwithstanding the fact that the germs he carries may not propagate on his person; he may carry them in his bowels in active vegetation, or they may be preserved for a time on his clothing, in damp habitations, in stagnant water, on the surface of vegetables, and in food, such as milk, bread, etc.

The development of the bacillus of cholera depends on many conditions. It has been seen that it may live at winter

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temperature; that it may be destroyed by putrefaction; that it may live or die in water. In running water it is very difficult for these germs to develop.

In studying the etiology of a case during an epidemic of cholera, it is necessary to take into account the biological properties of its germ, and the conditions necessary for its existence and multiplication. Carried from locality to locality by man, either in the alimentary canal or in soiled clothing, it may gain a footing in polluted surroundings, filthy ponds, cesspools, etc., and there become a center of infection from which numerous other cases may spring. It is evident that the filthy condition of habitations offers very favorable conditions for the development of various germs, as well as the bacillus of cholera. Cleanliness is therefore absolutely necessary to fight the invasion of this enemy.

Treatment.— Two forms of treatment have been recommended, a preventive and a curative form. As preventive measures of a medical character, vaccination has been recommended, first by Ferran, of Spain, and since by various other more authoritative scientists.

I need not dwell on this question here, as it has been treated in preceding numbers of this journal. Neither do I need to enter into a discussion of hygienic, prophylactic measures, which have also been treated etiologically and otherwise in this journal. It is only necessary to mention that the exclusion of the germs from the alimentary canal is the only positive safeguard, and this cannot be done without the strictest care to ingest nothing that has not been thoroughly cooked. It is also necessary to disinfect the mouth every day, and the intestines at times, by antiseptic agents.

As a curative treatment, salol is proposed. This recommendation is based on the antiseptic property of this substance, and the fact that a great quantity of it may be taken at a given time. Owing to the fact that muriatic acid destroys the germ of cholera, we would say, theoretically at least, that both as a curative and a preventive measure, the drinking of small quantities of muriatic acid, very largely diluted, or other acids having a similar property, would prove beneficial. I only mention these indications as based on the biology and physiology of the germ.

It is not my purpose to go into any practical details. Of late, other medical journals have published numerous modes of treatment. Every practitioner should bear in mind that no treatment is likely to be successful unless the microbic invasion is stopped before any septic complications have taken place.

EXPLANATION OF PLATE.

FIGURE 1.— Different forms of cultures of cholera on agar-agar and gelatine plates (after Cornil and Babes). a, Colony on gelatine after 24 hours; b, colonies after 48 hours; c, colonies after 48 hours at a temperature of 68° F.; d, colonies after 3 days; e, colonies after 4 to 6 days; f, g, h, colonies developed at about 61° F. during 5 or 6 days; i, colonies on agar-agar developed in 24 hours at about 99° F. 1 and 2, other aspects of cultures on gelatine.

Fig. 2.— Living culture cholera bacilli (Cornil and Babes). a, b, c, d, Forms of the bacilli exhibited in their growth and development; f, g, i, their segmentation; k, mass of bacilli; l, m, n, elongated and comma forms; o, p, q, bacilli that remained united after their segmentation; r, s, t, u, v, undulated filaments; y, z, filaments segmented in bacilli remaining united.

Fig. 3.— Bacteria obtained after the first culture from cholera fæces (Cornil and Babes). c, c, Cholera bacilli; b, straight rod; a, other rods and filaments larger than cholera bacilli; m, other bacteria with extremities more deeply stained.

Fig. 4.— Section of a portion of the inferior part of the intestine intersecting a gland of Lieber-Kuhn in cholera (Cornil and Babes). c, v, Tumefied and hyaline cells of the gland; between the cells and the reticulated tissue of the mucous membranes exist a number of comma bacilli; c, r, granulous cells of Ehrlich.

Fig. 5.— Section of the cæcal appendix in a case of cholera (Cornil and Babes). b, Surface of the intestine showing diverse species of bacteria; s, superficial tissue having become hyaline with spaces containing a quantity of little bacilli; g, e, a tubular gland showing a hyaline state of its epithelial cells; the bacteria penetrate in a crevice between the epithelial cells and the basic membrane of the gland; t, r, reticulated tissue situated in the depth of the mucous membrane. (Magnified 300 diameters.)

CONTRIBUTION TO THE STUDY OF PROGRESSIVE MUSCULAR ATROPHY.

BY W. H. RILEY, M. D., BATTLE CREEK, MICH.
Member of the American Neurological Association.

(Concluded.)

Diagnosis.— In a case well advanced, the prominent symptoms of weakness and wasting of the muscles, together with a history of the gradual progression of the disease and the almost complete absence of sensory symptoms, leaves little that is uncertain in the diagnosis. But in the beginning of the disease, when the weak-

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ness and wasting is slight, and limited to a few muscles, a diagnosis becomes much more difficult. Under these circumstances we are to distinguish between it and the following conditions: —

1. *An inflammation of a nerve in some member*, which may be done by the limitations of the nerve, the rapid onset of the inflammation, and the accompanying sensory symptoms. 2. *A multiple neuritis.* In this we meet with the greatest difficulty, especially in those cases where the neuritis is limited almost entirely to motor branches of the nerve. In an ordinary case of multiple neuritis, the rapid onset of the disease, the usual simultaneous affection of the corresponding parts, *i. e.*, its symmetry, the accompanying sensory symptoms of pain, hyperæsthesia, anæsthesia, etc., a history accompanied usually by an obtrusive cause and a tendency usually to improvement is sufficient in most cases to make a distinction. 3. *A pachymeningitis.* In the latter the wasting is more rapid, and is always accompanied by sensory symptoms of pain and anæsthesia, frequently of irregular distribution. 4. *Idiopathic muscular atrophy.* Sometimes this is rather difficult. When several cases of muscular atrophy occur in the same family in childhood, it is most probable that they are idiopathic, and not spinal. Indeed we rarely see the spinal form of muscular atrophy under the age of twenty, and unless there are distinctive spinal symptoms, the idiopathic from is to be suspected. 5. Local atrophies are sometimes said to occur from the excessive use of the smaller muscles of the hand, but such cases must be extremely rare, and should be suspected only on the clearest indications.

Prognosis. — From the nature of the disease, the prognosis must from the first be grave. The tendency of the disease is to progress until it has become wide in extent and extreme in degree. Seldom does the disease cease spontaneously until an advanced stage is reached; but little is gained by this, as nothing is left but a mere helpless existence.

In those muscles that have been the seat of a slow and progressive wasting for six months or more, there is little hope of improvement, although the disease may be arrested by treatment. The prospect of any recovery depends somewhat on the rate at which the disease has advanced. Recent rapid loss of power, especially where the muscles present the reaction of degeneration, may in some cases be partially recovered from. The prospect for arrest seems greater in those cases where the disease affects corresponding parts of the body simultaneously, rather than in cases where the disease has advanced to a good degree on one side before the other side is affected.

One of the chief dangers to life is an involvement of the muscles of respiration. Bulbar paralysis is also a serious complication. While the outlook from the beginning is most serious, the patient is entitled to some encouragement and hope, as not infrequently the disease may be arrested, if not permanently, at least its onward progress may be stayed for a time by proper treatment. The outlook is more favorable in cases of middle life than in old age, and in those cases where the paralysis exceeds the atrophy and the reaction of degeneration is present in the muscles.

Treatment. — While the nature of the disease is such that nothing very brilliant can be looked for in most cases from treatment, much can be done to check the disease, and thus prolong life, even though an absolute cure is not accomplished, and in a disease attended with such serious results, nothing should be left undone that offers any possible encouragement or hope to the patient. The patient should be under as favorable hygienic conditions as possible. It is important that he should have plenty of fresh air, sunshine, a wholesome, nutritious diet, a moderate amount of exercise, and plenty of rest. In every case the cause should be sought for, and as far as possible removed. It is important to keep in mind the primary seat and nature of the disease, — that the seat of the disease is in the spinal cord, the nature of which is the fault of the nutrition of the essential nerve elements. Any treatment, therefore, tending to improve nutrition, and especially nutrition of these parts, will be in the right direction. The nutrition of the spinal cord may be influenced by the application of (1) heat, (2) cold, (3) electricity, and (4) exercise.

When heat is applied along the back directly over the spine for any length of time, the temperature of the tissues beneath is raised, more blood is brought to the parts, and the nutritive processes are modified and hastened. The application

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of heat to the spine may be made by the use of fomentations or a rubber bag long enough to reach the whole length of the spine, filled with hot water or water as warm as can be borne by the patient. The temperature should not be more than 120° F. This application of heat should continue from one half to three quarters of an hour, and be made daily; and if the patient is not so weakened by the disease as to produce fatigue, two applications daily are better than one.

When cold is applied to the tissues for any considerable length of time, heat is abstracted, and the temperature of the tissues is lowered. This calls forth an effort on the part of nature to maintain the normal temperature of the parts, and in this effort there must of necessity be an increase in the nutritive changes. These changes are hastened, and this may finally lead to the establishment of a more healthy nutrition in the parts that are the seat of the disease. The application of cold to the spine should be made in a similar way as that of heat, except that the spine bag is filled with ice water instead of hot water. The ice bag may be kept on the spine from ten to twenty minutes at a time, and the applications may be made once or twice daily, as the patient is able to bear. Too long an application of cold to the spine may result in depression, and do harm instead of good.

In most cases, the application of heat to the spine will, I think, be found more beneficial than the ice bag, especially in those cases where there is much weakness and emaciation. In some cases good results may follow from the use of the ice bag. Its effects on the patient should be carefully watched, and treatment modified if necessary.

In the application of electricity to the spine, the galvanic or continuous current should be employed. In making these applications, it is important that the current should pass directly through the spinal cord. In order to accomplish this effectually, a large electrode sufficient in size to cover the whole abdomen should be joined to one pole of the battery (preferably the negative), while to the positive pole is joined an electrode about three inches in diameter, or of such size as will well cover the spine transversely. The patient then lies on the large electrode, face downward, so as to make a good contact with the abdominal surface, and the small electrode is applied up and down the back over the spinal cord. By this arrangement, the current must pass directly through the spinal cord, and by using the electrodes of unequal size, the current is heaped up, so to speak, around the smaller, which is directly over the spinal cord; and thus whatever influence the current may have is brought to bear directly on the diseased tissues. With these sizes of electrodes the current strength should be from twenty to thirty milliamperes. Each application should last from ten to fifteen minutes, and in most cases the treatment may be given daily.

Exercise will undoubtedly have some influence on the nutrition of the motor cell and fiber which are the primary seat of the disease under discussion. Whenever the nervous impulses travel from brain to muscle, the nerve fibers all along the motor path, as well as the motor cells in the spinal cord, are brought into activity.

This is not the place to discuss the probable changes which take place in the nerve fiber when it is traveled by a nervous impulse, but it is a well-established fact that functional activity on the part of any tissue or organ is quite essential to the maintenance of a healthy condition, and this is not less true in the case of nervous tissue than of the muscles or any other organ.

Now by exercise, nervous impulses are made to travel over these nervous fibers and motor cells which are the seat of disease. As we have stated, this functional activity tends to maintain the nutritive processes, and to retard the morbid changes, the tendency of which is to bring the tissues still lower in the scale of degeneration. While exercise, properly directed, will result in good, it is important that too much exercise should not be taken. In order to determine best the amount of exercise that is adapted in any particular case, the strength of the different muscles of the body should be carefully measured, and the case closely watched. It should be remembered that the nutrition of the spinal cord is lowered, and that the resistance of the nervous elements is less than in health; and while a moderate degree of exercise may improve this, too much may do harm by taxing the nerve cells and fibers beyond their

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capacity. The above, of course, applies only to cases that are able to take exercise. When the disease becomes well advanced, and the patient is entirely helpless, any exercise will be impossible. The patient should have plenty of rest, and should avoid exhaustion.

The application of heat and cold alternately to the spine, often does good by acting as a general tonic. In this case the heat should be applied for about five or ten minutes, followed by a cold douche for about five minutes, and these applications kept up alternately for about one half hour. In many cases, cold spray or a cold wet sheet rub will result in much good. This treatment should be applied carefully, so as to avoid a shock or chill, and in such a way as to be followed by a good reaction. The beneficial effects come in two ways: 1. It has a general tonic effect on the body; 2. It has a special action on the spinal cord by acting through the afferent nerves.

When cold is applied to the skin in this way, impulses traveling along the afferent nerve by reflex action, reach motor cells and fibers and stir them up to increased functional activity. The stimulation produced by this means is undoubtedly greater and more beneficial than is usually accredited to it.

Along with the treatment that is directed especially to the spine, the muscles should not be neglected. Their nutrition may be acted upon and improved by the use of the massage and the application of electricity in the form of faradic and galvanic currents. As a rule, better contractions will be obtained in those muscles that are the seat of paralysis and wasting by the use of the galvanic current, and not infrequently contractions will be obtained from its use when it is impossible to obtain contractions with the faradic current. The adaptability of the current in any particular case may be determined by a careful examination. When the galvanic current is used for treating the muscles, my practice is to use a large electrode at some indifferent point, as over the lower part of the back or over the abdomen, and the current is applied to the muscles with a smaller electrode, the current being rapidly interrupted. Usually better contractions will be obtained by applying the negative pole over the muscles. If, however, the destruction of nerve is rapid and in excess of the wasting of the muscles, the anodal closure contraction may be as great as the cathodal closure contraction, and there may be no choice as to which pole is used.

The electrical treatment of the muscles should be given at least on alternate days, and may in some cases be given daily; each treatment should occupy about twenty or thirty minutes in its application.

The use of massage with active and passive movements is beneficial to the nervous system as well as to the muscles. Its effects on the patient should be carefully watched, for when used excessively, may break down muscle instead of building it up. The method of its application and the skill of the manipulator have much to do with its beneficial effects.

The beneficial effect of exercise on the nervous tissue has already been referred to. What has been said in this connection will apply with equal force to the muscles. The voluntary contraction of the muscles improves their nutrition, causes more rapid changes in the circulation of the blood through them, and tends to hinder their wasting.

Warm baths will be found useful in some cases.

It is very doubtful if much good comes from the use of drugs in this disease.

We would hardly be doing justice to the subject, however, if we did not call attention to the treatment recommended by Dr. Gowers, of England. He claims that he has been able to arrest the disease in more than fifty per cent of the cases he has treated, by the use of hypodermic injections of nitrate of strychnine. The injections are made once daily in any part of the body. The dose first used is one hundredth of a grain, rapidly increased to one fortieth of a grain daily. In seven consecutive cases treated by this method by Dr. Gowers, the disease was arrested in a month, and the arrest was permanent in all except one. Dr. Gowers claims that it is important that the drug be used hypodermically in order to get the best results. When the malady is apparently arrested, it is well to intermit treatment one week in three or four.

We cannot speak from any personal experience with the above treatment, but if such favorable results can be obtained in a disease so serious, and so unyielding to the usual treatment, it is certainly worthy of a faithful trial.

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TRANSLATIONS AND ABSTRACTS

[The articles in this department are prepared expressly for this journal.]

GLYCOGENIC FUNCTION OF THE LIVER.

BY DUJARDIN-BEAUMETZ.

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TREATMENT OF DIABETES.

Translated by J. H. Kellogg, M. D.

(Concluded.)

In the preceding lesson (see BACTERIOLOGICAL WORLD AND MODERN MEDICINE, December, 1892, page 438), I have shown the influence of the nervous system upon the production of sugar. The fact of this influence finds confirmation in therapeutics; and drugs which diminish the excitability of the cerebro-spinal axis, act favorably in diabetes. Formerly, opium in large doses was advised in these cases, but the disorders of the digestive functions produced by this drug have led to its abandonment. Félizet has advised bromide of potash, but here also, in spite of the real advantages obtained by the bromide, certain inconveniences attend the use of the drug, which counterbalance its advantages. I refer to the depression of the vital forces which accompanies the employment of the bromides, and the eruptions produced by them.

Worms has highly recommended sulphate of quinine, which gives, we must admit, some results which are often advantageous. But here, still, the prolonged use of this salt produces, in certain patients, gastric troubles; and it should never be forgotten that all medication which compromises the digestive functions of a diabetic patient, must be abandoned. For myself, I give preference to antipyrine. The effects observed by G. Sée, by Panas, and by Huchard, have shown the favorable influence of antipyrine in the polyuria of diabetes. I say diabetic polyuria, because it is especially against the excess of urine that antipyrine acts; and as by diminishing the amount of urine excreted daily, it does not increase the quantity of sugar, it is easily understood that a favorable effect is obtained by diminishing the quantity of sugar eliminated in twenty-four hours.

All these drugs act through the medium of the nervous system; and it is by diminishing the excitability of the superior portions of the spinal cord that their therapeutic effects may be obtained. Should jambul be included in this group? I do not dare to affirm this.

In a thesis by one of my students, Dr. Willy, it is shown that jambul acts only as a complement of alimentary medication; that is to say, when the sugar cannot be made to disappear completely from the urine by means of a suitable regimen, the quantity of sugar may be further reduced by employing grains of jambul in the form of a powder. On the contrary, in grave diabetes this drug aggravates the condition of the patient.

If you have recourse to jambul, the powder of the grains or of the bark may be administered in the dose of one gram at breakfast and one at dinner.

As drugs which diminish the excitability of the spinal cord are favorable in the treatment of diabetes, it is easy to understand that an excessive amount of work, and all circumstances which tend to increase the excitement of the brain and spinal cord, are dangerous. Disappointments, a prolonged amount of work, and violent emotions are also aggravating in cases of diabetes; and it may be said that when the sugar reappears in the urine of a patient, without any violation of the rules of his regimen, it may safely be affirmed that the cause is some mental or moral influence which has profoundly disturbed the cerebral and spinal functions; hence the conclusion that it is necessary for the diabetic to avoid overwork, violent emotions, and cares and anxieties of all sorts.

I now pass to the consideration of the diathesic treatment of diabetes. The diathesis which predisposes to diabetes, is the arthritic, and in the majority of these patients you will find gout and calculi in their heredity. By means of appropriate treatment, we are able to act upon this diathesic origin of the disease, and it is here especially that arsenic and the alkalies render us great service.

How do the alkalies act? The opinion of Mialhe, who maintained that the blood of diabetics is acid, is to-day recognized as wholly erroneous. It is by favoring the oxidation of organic substances that

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the alkalies act favorably in diabetes. You will recall the fact that Cagniard, by watering with alkaline solutions the sugar-producing vegetables, has prevented the production of sugar. For myself, I believe that it is especially in regulating the nutrition that the alkalies act.

The recent researches of Frémont, who has studied the coefficient of oxidation in diabetics, by the aid of the method given by A. Robin, supports this view. Whatever explanation may be given, the administration of alkalies in diabetes is always favorable. Lithium, and especially alkaline waters, may be utilized, to which may be added strontium, which, under the form of lactate of strontium, gives such good results in the cure of albuminuria.

To these alkalies it is necessary to add arsenic, which is a valuable drug in diabetes. Experimentally, Quinquaud has shown us that when an animal is submitted to prolonged arsenical treatment, diabetes can no longer be produced by a lesion of the bulb. Arsenic and the alkalies may be associated with advantage, and the formula of Martineau appears to be the best. You give, in a glass of Vichy water, one of the following doses: Carbonate of lithium, 5 grams: Fowler's liquid, 2 drops. The patient should take a glass of this mixture before breakfast and before dinner.

Baths are of special value in these cases. Arsenical waters and waters impregnated with bicarbonate of soda, dispute priority. Vichy, Bourboule, Saint Nectaire, and Miers, in France, and Carlsbad in Germany, occupy the first rank in the thermal treatment of diabetes.

It cannot be doubted that thermal treatment happily modifies the nutrition in diabetes, and secures the disappearance of sugar, while allowing a considerable latitude in diet.

Such are the curative means to be employed. Let us now see what results may be obtained, and what modifications must be made in the treatment, during a prolonged course of this disease. The results which are obtained in the treatment of diabetes by a rigorous dietary, allow us to group our patients in three classes according as the severity of the disease is light, medium, or grave.

In the first class of cases, we obtain, in a short time, complete disappearance of sugar, no matter how large a quantity may have been observed at the beginning. I have known patients to eliminate more than 400 grams of sugar daily, from whose urine the last trace of sugar had disappeared at the end of eight days' treatment. In cases of this class, the sugar tends to reappear when either sugars or starches are used in excess.

In cases of medium severity, the disappearance of sugar is never complete; even when baths and medication are added to a strict regimen, from twenty to thirty grams of sugar in twenty-four hours will always remain.

Finally, in grave diabetes (diabetes with emaciation), the quantity of sugar eliminated in twenty-four hours is only slightly modified by the dietary, and the patient continues to eliminate 100, 200, and even 500 grams of sugar daily. To these grave conditions the name of "pancreatic diabetes" has been given. Taken in its strict sense, the name is not exact, since, while all cases of pancreatic diabetes are grave, the reverse is not true. I have myself observed cases of fatal diabetes without lesion of the pancreas. It matters not whether or not grave diabetes is accompanied by lesions of the pancreas; our therapeutic efforts always fail in these cases; and no matter what methods are employed, the patient becomes more and more emaciated, and finally succumbs, in the majority of cases, with symptoms of coma.

What therapeutic course should be pursued in each of these three forms of diabetes? In grave diabetes, I confess that, impressed by the failure of a special diabetic regimen and the danger of comatose symptoms, when these patients are submitted to an exclusively flesh diet, and especially by lack of appetite which follows when one regulates the dietary too rigorously, I allow grave diabetics to eat whatever they like, avoiding only sugar and fruits. In cases of medium severity, however, I maintain a special and severe diabetic regimen.

In mild cases of diabetes, I regulate the dietary by the results obtained by frequent analyses of the urine, suppressing sugar and fruits, although I allow bread and some starches. Duhomme's analysis enables the patient to make daily analyses of his urine, by means of which the dietary of mild and medium cases of diabetes may be regulated. When the sugar reappears in the urine in too great

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quantity, as the result of digressions in diet or violent emotions, it is necessary to return to a more severe regimen, and make use of antipyrine.

Esbach, in his "Traité du Diabéte," has remarked that it is necessary to disaccustom the liver to the manufacture of sugar. Without absolutely adopting his view, I think, however, that when the sugar reappears, it is necessary to prescribe a severe regimen for a week; then, when the sugar diminishes to 10 grams or less in twenty-four hours, let the severity of the regimen be relaxed a little. It may be said that there are some diabetics in whom the equilibrium of health is maintained by eliminating, through the urine, a certain quantity of sugar every twenty-four hours. In such cases, when the diabetic regimen is carried too far, the patients become emaciated, lose appetite and sleep, and find themselves in a condition worse than before. Here is a question of tact which requires careful attention from the physician.

Great longevity is compatible with diabetes of medium intensity, and patients of this class have been known to attain to a very advanced age, although eliminating in the urine each day a small quantity of sugar. The same is still more emphatically true of patients suffering from the mild form of diabetes. However, in spite of these favorable circumstances, it must be remembered that the fact of being a diabetic, or predisposed to diabetes, indicates an inability to resist other diseases which may occur coincidently, so that when a diabetic suffers from an infectious or an inflammatory disease, his enfeebled system very easily succumbs to the shock. In the epidemic of influenza which occurred in 1889–90, this fact was strikingly confirmed by the extreme mortality of diabetics suffering from the epidemic.

As to grave diabetes, the prognosis is most serious, and death is always a consequence in these cases. Lancereaux fixed the duration of pancreatic diabetes at four years as the maximum.

These three species of diabetes are classified according to their respective origins, and one never sees diabetes of light or medium intensity transformed into a grave diabetes, it being understood, of course, that the patients follow the prescribed dietetic regimen. To explain: Here is a diabetic who passes 300 grams of sugar daily, but eight days of regimen suffice to bring the quantity of sugar to zero. If, however, the patient should continue to eat as before, taking no care of his health, he would find himself in the same conditions as a grave diabetic passing the same quantity of sugar; his strength would fail, and various complications would arise, such as ordinarily terminate the life of this class of diabetics.

These complications are four in number: —

1. Nervous troubles, of which diabetic coma is the highest expression.

2. Gangrene, and sometimes a true gangrenous septicæmia.

3. In the consequence of the presence of sugar in the secretions, which thus constitute favorable media for the culture of certain micro-organisms, and in particular, that of tuberculosis, these patients become tuberculous.

4. The passage of saccharine urine through the glomerule of the kidney produces sclerosis of this organ, which results in albuminuria. This is one of the most common conditions found in old diabetics with excessive urine. It may be said that there are few who escape this complication.

In concluding this lesson, I should say a few words respecting the treatment of these complications.

There is very little to be said respecting the treatment of diabetic coma. Coma is a symptom which often occurs in grave diabetes. In these cases, the odor of acetone in the breath enables one to make a diagnosis of diabetes at a distance by simply entering the patient's room. Acetonæmia has been given a preponderant role in the pathogeny of diabetic coma, but this is not the only hypothesis by which these nervous symptoms may be explained. Some have supposed it to be due to aceto-acetic acid. Others have attributed the intoxication to the action of oxybutyric acid β.

I shall not enter into a detail of all these hypotheses. I shall confine myself wholly to therapeutic considerations. I confess that up to the present time, I have had only failures in the treatment of diabetic coma. I have employed injections of caffein and inhalations of oxygen, and have always failed. It is true that I have not employed more active methods, and in particular, that sug-

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gested by Stadelmann, who has recommended subcutaneous and intra-venous injections of alkaline liquids. Lépine has employed, without success, injections of solutions of chloride and bicarbonate of soda. Others have recommended alkaline preparations, but in the great majority of cases, failure has been the result.

As the gangrene is a complication, everything depends upon the extent of the suppuration and the gangrene. In certain cases, there is a true gangrenous septicæmia which attacks all portions of the body at nearly the same time. These frightful cases are all beyond the resources of therapeutics. When, however, the case is one of limited gangrene, or of gangrenous anthrax, unhappily so frequent in diabetes, the question presented is one of surgical intervention. Some affirm that in spite of the presence of sugar in the urine, active intervention is required, laying freely open the anthrax, or removing the dead parts. Others, on the contrary, maintain that in such cases, surgical intervention is more dangerous than useful. I am myself disposed to take the last view. In diabetics who still have sugar in the urine, I have always seen the fatal termination hastened rather than retarded where surgery has been resorted to. It is better, in such cases, to wait until the patient's vital forces have been rallied by tonic medication and by rigorous diet, and the sugar has been reduced to less than ten grams in twenty-four hours; then surgical intervention may be made with some chance of success. , Before this has been accomplished, it is better to modify the antiseptic dressings, and especially the means recommended by Prof. Verneuil, viz., sprays of a two-per-cent carbolic acid solution.

There is little to be said concerning the phthisis of diabetics, which is most frequently a slowly progressive phthisis, the phthisis of old persons, but sometimes having a rapid course, always, however, inducing loss of appetite, which is a matter of the greatest gravity in diabetics. So long as the tuberculous diabetic can eat, one may hope, not to cure him, but to prolong his life for some time, in spite of the tuberculosis. But if the appetite fails, the vital forces fail very rapidly, hectic fever appears, and rapidly hastens the death of the patient.

Before mentioning the complication which is the most frequent — albuminuria — I wish to say a few words respecting cerebral or spinal softening which may be connected with the nervous disorders of diabetics. Bouchardat pointed out the fact that there is often a tendency to cerebral softening in diabetics, and I have found this statement to be true. In such cases, nothing can be done. The same is not true, however, in albuminuria. The point most difficult in these cases, is to establish a proper dietary. I have often presented to you the regimen required in renal insufficiency, which is based entirely upon the vegetarian regimen, that is to say, a regimen which reduces to a minimum the quantity of toxines introduced with the food. Unhappily, this regimen comprises milk, farinaceous foods, fruits, and foods which are discarded from the diabetic regimen, so that we have nothing left with which to nourish our diabetic and albuminuric patient, except eggs and legumes, which are manifestly insufficient. In these cases, we may, however, add certain meats, as very well cooked meats, gelatinous meats, such as veal, beef, chicken with rice, beef-tongue, etc. It should be well understood that fish, game, clams, oysters, crabs, lobsters, and all mollusks and crustaceans should be forbidden. Only fresh cheese can be permitted. As regards the question of a milk diet, one must be guided by the state of the patient.

When the symptoms of renal impermeability are more prominent than those of diabetes, a milk diet should be ordered without a moment's hesitation. Frequent analysis of the urine should be made, to see if the quantity of sugar increases.

To the milk diet should be added inhalations of oxygen and caffein, which are useful both in diabetes and in albuminuria. The lactate of strontium may also be employed, as this drug is efficacious in both conditions. Lactic acid has been highly recommended by Cantani, in diabetes. As to the lactate of strontium, I have shown, after G. Sée and C. Paul, its utility in albuminuric nephritis.

To Increase the Intensity of Heart Sounds.—Have the patient lie upon the back, and elevate the arms and legs, the head being supported upon a cushion. This causes contractions of the bloodvessels of the arms and legs and an accumulation of the blood in the trunk, thus increasing the arterial tension and the intensity of the heart's action.

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LIVING AND CHEMICAL FERMENTATION.

[Extract by Paul Paquin, M. D.]

FERMENTATION, as is well known, is classed in two categories, the one depending on living beings (vital fermentation), the other depending exclusively on chemical processes independent of life, and capable of developing in absolutely sterile media (chemical fermentation). The fluoride of sodium which at one per cent stops instantly and definitely all vital fermentation, and with it all manifestations of life without suspending chemical fermentation, permits the appreciation of the phenomena of the other group.

The addition of one per cent solution of fluoride of sodium preserves organic matter from all putrefaction, even at a temperature of 40° to 45° C. All substances thus preserved, such as milk, blood, urine, bile, beaten eggs, fruits, fragments of animal tissue, saliva, pancreatine, gelatine, etc., presented after several months at 40° C., neither odor or any other alteration characteristic of the development of microbes. The sugar, the disappearance of which from an organic medium is one of the first microbic phenomena in living fermentation, is preserved totally in fluorated liquors. It is not in the precipitation of the salts calcium that the fluoride is sterilized; for the oxalate of sodium at one per cent has not the same property: it retards only the beginning, and moderates the march of putrefaction.

The lactic ferment is destroyed by the fluoride of sodium at one per cent; it suffices generally to add to the milk 0.4 per cent of fluoride. The sugar of milk is preserved in toto in the fluorated liquors.

The ammoniacal ferments of urine are inactive in the presence of fluoride of 1 per cent. The resistance to the action of this salt, as to that of the lactic ferment, is less than that of the micro-organisms of putrefaction and of that of the molds. The quantity of the urea in fluorated urine is invariable.

The fluoride of sodium at a dose of 0.3 per cent arrests the alcoholic fermentation of sugar instantaneously.

The fluoride of sodium at the stated dose then prevents the development of living elements in organic liquors and tissues. Inferior doses are even sometimes sufficient to completely sterilize; but always, even in very small doses, the appearance of fermentation is retarded and the intensity is diminished. The soluble ferments — invertine, trypsine, emulsine, etc.— preserve their activity in the presence of fluoride of sodium. The products of fermentation are the same whether the fermentation occurs in the presence or the absence of this salt. The natural digestive juices — gastric juice, pancreatic juice, and the digestive juice of masceration — preserve in the presence of the fluoride their normal property. After several months these soluble ferments are not destroyed by the salts by 1 per cent at a temperature of 40° C.

The alcoholic fermentation of saccharose presents two phases: one is an inversion of the sugar,— a chemical phenomenon; the other is the splitting of the inverted sugar,— a vital phenomenon; the fluoride of sodium stops only at the second fermentation.

The blood may transform the glycogen into reductive sugar, by means of the diastase that it contains; the fluoride of sodium does not prevent this fermentation.

The liver separated from the organism and free from blood by intravascular washing, transforms its glycogen into sugar. This transformation is possible in the presence of one per cent of fluoride of sodium, that is to say, in the very conditions in which the life of the cellular elements is impossible; hepatic glycogenia, therefore, is a phenomenon of chemical fermentation. Furthermore, hepatic masserations kept sterile by the fluoride of sodium, preserve the power of transforming the glycogen into sugar, during weeks and months, that is to say, during a time infinitely longer than the possible duration of life of the cellular elements of the liver.

The defibrinated or oxalated blood consumes its oxygen, and produces carbonic acid gas. The fluoride of sodium stops completely and definitely this phenomenon of oxydation; the nature and the gas of the fluorated blood remain invariable. The transformations which occur in the non-fluorated blood are the phenomena of the vital respiration.

The green parts of the vegetables lose by the action of fluoride of sodium, the property of decomposing carbonic acid gas and liberating oxygen. The chlorofilian function, then, is a vital phenomenon.

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Finally, the fluoride of sodium at one per cent kills every living thing, and opposes the development of vital fermentation without arresting chemical fermentation. It permits the determination of the nature of the phenomena having their seat in an organic medium, and explains whether they belong to a vital action or to a diastasic action.

A New Treatment for Glanders.— Owing to the pathological relations that seem to exist in the neoplasms between tuberculosis and glanders, M. M. Nourry and Nichel have attempted the treatment of glanders by hypodermic injections of creosote in oil, to produce the resorption of the pulmonary tubercles and the glandular adenites, with chloride of zinc as a wash in the nostril, to combat the ulcerous destructions and discharges therefrom. After two months, two horses thus treated appeared totally cured. The injections were made with a Pravaz syringe, at first with oil at 10 per cent, and then at 25 per cent, and finally at 50 per cent. A student of the Pasteur Institute who was accidentally inoculated with glanders, was treated by injections of creosote and oil by Dr. Burereaux, but in vain.

Etiology of Leprosy.— Dr. Geo. L. Fitch, in the New York *Medical Record* for September, concludes an important paper on leprosy as follows: —

"1. We have the clearest and most unmistakable proof that leprosy is a non-communicable disease, as leprosy, under any circumstances.

"2. Leprosy invariably follows the introduction of syphilis among virgin races so quickly as to point most strongly to a common origin.

"3. It is a well-known fact that syphilis, in an immense majority of cases, cannot be acquired under any circumstances a second time. While the twenty cases in which I inoculated syphilis on lepers are not absolutely conclusive, still it is a point worth consideration.

"4. By accepting the view I have put forth, we have an easy, natural solution of leprosy,— a non-communicable disease after it declares itself as leprosy,— spreading as it does spread, and still being in itself non-contagious and non-communicable. In this way, also, we are able to account for those isolated cases of leprosy which now and again appear in communities otherwise free from the disease, and in which the subjects affected with it can never by any possibility have come in contact with it."

He considers that leprosy is not a disease of individual and special characteristics, but is in fact a fourth stage of syphilis. It occurs epidemically in races virgin to this disease. This opinion is not fully sustained, if at all, by experimental research, and it is interesting to note that bacteriological investigations have failed to produce any evidence in support of it. The bacillus of leprosy has been demonstrated and is plainly visible by exact microscopical and bacteriological methods, while no such germ has ever been found in syphilis.

Pancreatic Diabetes.— In the year 1877, M. Lancereaux demonstrated the existence of a sugar diabetes with a rapid evolution, connected with the destruction of the pancreas. In 1888, the same author classified diabetes as follows: First, nervous traumatic or spontaneous diabetes; second, constitutional or fatty diabetes; third, pancreatic or lean diabetes. Experiments made since then upon animals confirm the existence of the latter kind.

The total extirpation of the pancreas in dogs, produces every time the sugar diabetes between 28 and 120 days.

From other experiments and observations, MM. Lancereaux and Thirolvix conclude that there is a form of diabetes connected with the destruction of the pancreas; this diabetes does not come from the absence of external glandular secretion, but simply from the absence of sugar secreted internally by the gland, and resorbed by the blood and lymphatics.

Treatment of Cholera.— Christmas, in his studies at the Pasteur Institute, found that 1 gm. of citric acid per liter of water produced an inoffensive beverage, capable of preventing the growth of the bacilli of cholera and typhoid fever.

Lowenthal recommends for the treatment of cholera the administration of salol, which, according to him, is almost specific. He gives at first 2 grams, then 50 centigrams to 1 gram every half hour. A physician, in treating 53 cases by this method, had only three deaths.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Action of Light on Bacteria.— The action of light on bacteria has often been studied and discussed. The *Pacific Record of Medicine and Surgery* has the following abstract from the pen of Prof. H. Butchner on this subject, which is of interest: —

The author begins his communication with a short exposé of experiments instituted by him on the noxious action of light on bacteria which had been repeatedly ascertained by former observations. By extending the field of his investigations to the bacteria suspended in water, and by varying the secondary conditions, such as access of air and the like, in many ways, he was able, with the aid of the gelatine plate culture, to demonstrate conclusively a powerfully disinfecting action of light on all bacteria hitherto examined,— *b.* typhi, coli communis, hyocyaneus, cholera vibrio,— and on some bacteria of putrefaction. Thus in water which in the beginning of the experiment showed in 1 ccm. ca. 100,000 germs of *b.* coli communis, was entirely free of any germ after a single hour of direct action of sunlight. Diffuse daylight also displayed a considerable disinfecting action, although not quite as strong as direct rays. Not even the addition of alimentary substances would impair this action.

"The author draws from these facts some important conclusions connected with the practical value of light as a disinfectant: —

"1. All former experiments on the life of bacteria in water, which have failed to take into account the influence of light, have lost their conclusiveness.

"2. The often discussed and ventilated self-purification of rivers and lakes in connection with a decrease in the number of living bacteria, finds— without excluding the auxiliary action of other elements — a satisfactory explanation in the disinfecting action of light. The author recommends the practical application of these theoretical results by eventual intromission of sewerage waters of cities into flat clarifying basins provided with a white comentation.

"We may add that in many species of bacteria the disinfecting action of light was not demonstrable, but these same bacteria, belonging to the class of genuine aquatic bacteria, are harmless in a hygienic respect."

The Bacillus of Soft Chancre.— Dr. Unna, according to Dr. Pusey in a report made in June in the *Annales de Dermatologie et de Syphilographie*, has discovered the bacillus that seems pathogenic of the soft chancre. The forms he describes are found most numerous in the ulcerated tissue, and rarely between the cells of the neighboring tissue. This germ may be isolated in sections, by colorizing with methyl-blue and decolorizing with stirone or ether.

According to Unna, this is the only germ found in soft chancre, and he has seen it in every soft chancre studied microscopically by him. It has been found in the ulcerated tissues, but not in simple ulcers nor in the initial ulcerated sores, nor in the pus. A cultivation of this micro-organism should be made to verify the very reasonable conclusion arrived at, that this bacillus is the cause of soft chancre.

Dr. Ducrey, some years ago, reported having discovered a germ in soft chancre, and that he reproduced it with certain lesions by inoculation of the pus. But pus of this kind (as pus of other kinds for that matter) has too many different microbes, and such inoculations are practically valueless.

The Growth of Cholera Bacilli on Gelatine.— The growth of cholera germs on gelatine is characteristic, and can scarcely be confounded with that of any other germ. Almost all of the varieties of bacteria from the dejecta fail to liquefy gelatine. The comma bacillus liquefies it so that within 24 hours small spots of liquefaction are seen to appear, and the surface appears as if it had been punched in different places with a pin; lastly, if the microscope reveals comma-shaped germs, the diagnosis is practically settled.

In some rare cases, the following method devised by Schottelin may be adopted to verify the diagnosis: —

Mix the dejecta to be examined with two or three times its bulk of meat-juice broth, and keep at a temperature between

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88° and 90° F. for about twelve hours. The cholera bacilli will form a delicate scum on the surface of the fluid. They live there in order to get oxygen. Particles of this scum may be stained at once, and then gelatine plate cultures made in order to disprove or verify the results of this first liquid culture.

There has been in vogue a chemical test with mineral acids to the effect that the dejecta of cholera patients in contact with them would produce a kind of red color — so called cholera-red. It has been found, however, that other germs in the fæces in contact with mineral acids produce the same reaction.

Bacteriological examinations should be made shortly after the passage of dejecta from the bowels; for if allowed to remain awhile, especially in warm weather, other bacteria will soon destroy or mingle with the cholera bacilli, and will render positive diognosis difficult.

The microscopical examination should always be made with the greatest care, and the gelatine cultures should be resorted to as the most positive means of diagnosis.

Origin of the Poison of Arrows.— Dr. LeDantec found, in 1890, that the arrows of Oceanica were poisoned with the earth from marshes, in which, it was supposed, the bacilli of tetanus and some septic vibrio were to be found. The theory was that the exposure of these arrows to the sun destroyed the septic vibrios, which are less resisting to sun heat than the tetanus germs, but allowed the latter to live. The arrows, on the study of which these conclusions were arrived at, were very old, and all produced tetanus. Dr. LeDantec had to inoculate very sensitive subjects, namely, young guinea-pigs, to get the desired results.

Recently he has made new studies on the subject, with fresh arrows brought to him from the New Hebrides. With the poison found on the point of these arrows he was able to produce the Pasteur septicæmia, and demonstrated the existence of the germs by inoculations of cultures and various bacteriological studies. The fresh arrows contain large quantities of the germs of septicæmia, which predominate over all others, and it is doubtless a fact that if these arrows were exposed to the sun a long time, the septic germs would die and leave only those of tetanus.

By the way, it may be interesting to know that though there has never been a horse in the New Hebrides, the germ of tetanus exists in the marshes. Thus the theory of the equine origin of tetanus receives a very severe blow.

Coloration of Micro-Organisms that Remain Untouched by the Process of Gram.— M. Nicolle, of the Pasteur Institute, has discovered a method by which it is possible to color germs that resist the process of Gram. This method is based on the property of tannin to render insoluble the methyl-blue fixed on a preparation. He operates according to the following method: —

The sections of the tissues, hardened by alcohol, are put in contact with Loeffler blue of Kuhne blue from 1 to 3 minutes. They are then washed with water, and treated with a 1-per-cent solution of tannin, which acts almost instantaneously. The sections are then immersed in water, dehydrated with absolute alcohol, and then they are cleared by treatment with essence of cloves or bergamot, and mounted in Canada balsam or xylol after washing in xylol.

In sections thus colored, the microorganisms appear in a very deep blue tint, and the tissues are not so much colored. If a contrast more marked than this is desired, the sections should be treated slightly with acetic water, that is, water containing a few drops of acetic acid. By this process, the germs of glanders, typhoid fever, hog cholera, pseudo-tuberculosis, chicken cholera, and soft chancre (Unna's germ) may be readily colored.

When are Cured Diphtheritics Safe? — Roux and Yersin (Pasteur's Laboratory) announced some time ago that the bacillus of diphtheria may be found in the pharynx of persons who have suffered from the disease, as long as five weeks after their apparent recovery and the disappearance of the diphtheritic membrane. Since then, other equally accurate investigators have, by actual inquiries, confirmed this statement. Tobieson (*Centralblatt für Bakt. u. Parasiten Kunde*) made examinations of forty-six cases of diphtheria, in which he found the germs of this disease at various periods after the disappearance of the membrane.

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THE NEW AMERICAN DISEASE.

FOR a generation, Americans have been known abroad as a nation of dyspeptics. When the writer was first in Europe, a number of years ago, the remark was made to him by an eminent English physician, "I suppose you have to deal chiefly with dyspeptics in America." Admitting this to be true, we were glad, for the sake of American medical science, to be able to assure him that medical work in this country was not quite so monotonous as he had been led to believe. We are doubtless all tired of being called a nation of dyspeptics, and it may be a relief to know that a new disease, supposed to be characteristically American, has been discovered.

The late Dr. Beard, of New York City, formulated a group of symptoms which he thought indicated an individual disease, and to which he applied the term neurasthenia. American physicians have found this disease so common in this country, as compared with its frequency in the people of other nationalities, that it has also come to be called the American disease. Strictly speaking, neurasthenia is not a disease, but only a symptom, or a group of symptoms, resulting from a diseased condition, the root of which, in the great majority of cases, is found to be disordered digestion. It is not singular, then, that neurasthenia has followed so closely upon the heels of dyspepsia. Bad digestion results in impoverished blood from which an inferior quality of brain, nerve, and gland tissue is made, and this, in turn, gives still worse digestion and consequently still worse blood, worse brain, and worse nerves; and thus we have formed a vicious circle, or spiral, working ever in a downward direction.

An eminent English physician, recently writing concerning the debility commonly connected with the state of neurasthenia, or nervous prostration, for that, in common parlance, is the real meaning of the term, finds the cause of this state in the high-pressure system of life which prevails at the present time. He says so many good things respecting the causes of this new malady, and in so forcible a way, that we take pleasure in quoting the following paragraphs from the article referred to, in the *British Medical Journal*:—

"A very large proportion of the adult population in large cities, I would say almost one half, have an organization incapable of living at the high rate of pressure by which the material success of the capital-lacking individual can alone be attained in these days. Some are wise enough to perceive this, forego their success, and retain their modicum of health. Others are not so far-seeing, but fretfully attempt to keep pace with their stronger neighbors; but the result is a succession of arduous leaps instead of a steady running along life's road, till by degrees the leaps get smaller and smaller, ending finally in an utter breakdown, from which oftentimes there is no complete rallying, and the rest of life is one of peevish invalidism, or at best but one of senile energy.

"To most of us, however, it is not given to choose the amount of work we shall perform; unfortunately we find ourselves set to labor beyond our strength before we are aware of the weakness of that strength. When we discover our weakness, we have but Hobson's choice remaining to us, either to fall out of rank altogether and begin life afresh, or else to continue the uphill struggle against

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high pressure with an organization fitted only for low-pressure exertion. To impress upon us, disciples of medicine, the manifest unwisdom of this course, is no more difficult than it would be to explain to an engineer the folly of giving a low-pressure engine high-pressure work to perform. But with the laity it is far different; to women, young people, and uninstructed males, I can understand that even the mechanical engin er would have difficulty in explaining the dangerous madness of using a low-pressure engine for high-pressure work; and if so, can we wonder that the best instructed and best balanced laic minds, with the intensity of necessitous desire obscuring their dimness of vision, should fail to be convinced by us, who are the engineers of their frail humanity, that its frailty is incapable of high-pressure action? Hence we mourn over lives prematurely blighted, over lives broken down and finished when they should but have reached their prime. Hence also the unaccountable perversion to peevish irritability of some tempers, previously well under the owners' control. Hence the sudden outbursts of puny anger over the merest of trifles which go so far to embitter and alienate domestic love. Hence the half mad rushings to excess in tea and alcohol and various other stimulants with which the poor debilitated one still trusts to bolster up his broken strength a little longer. Hence, later on when the fight is recognized as hopeless, the fatal indulgences in the various nepenthes which help one to forget the misery of chronic invalidism,— that consciousness of never again being able to do a good day's work.

"As with the breadwinner, so is it with the housewife, for her duties, to her mind, appear equally imperious and exacting. So is it, too, with the mere pleasure-seeker, who often drags a body more fit for bed than dancing, to a weary rout. With children, another evil — that of ignorance and fatal unconcern for health, which they consider to be the care of their parents,— is, perhaps, the chief cause of the overstrain which they often with utter recklessness put upon their constitutions; at a time, too, when these constitutions are developing most rapidly, and therefore require much husbanding of energy.

"Again, we have the too ready return to work after the exhaustion of a severe illness, such as typhoid or influenza, when nutrition is but feebly reasserting itself, and, occupied as it is with repairing past ravages, is unable to provide pabulum for fresh exertion."

GOOD (?) BURGUNDY.

THE idea that good wine will make good blood is one of the fallacies which seem to be quite prevalent in the medical profession. The composition of wine and blood is about as different as that of any two bodies could be, notwithstanding the fact that red wine and red blood have a slight resemblance in appearance. This incidental fact is really the only foundation that can be discovered for the idea that wine possesses the property of enriching impoverished blood. The only way in which poor blood can be made better, is by an improved quality of food or better digestion. The experiments of Dr. Roberts showed, long ago, that wine hinders rather than helps digestion; and chemical analysis shows clearly enough that wine contains no elements which are essential to good blood, or which are capable of enriching the blood,— notwithstanding, prescriptions continue to be written for "good porter," "good claret," "good champagne," and especially "good Burgundy." We have this description of the manufacture of good (?) Burgundy, quoting from Thudichum and Dupré: —

"Now comes a phase in the production of Burgundy which is unparalleled in any wine product of the country. The fermentation is complete, and the wine has

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to be drawn, but it is desired to impart to the wine all the color that can be extracted from the husks. For this purpose, the husks which have been collected in the chapeau have to be thoroughly mixed with the alcoholic fluid. The top of the chapeau, which is mostly a little rotten and sour, is therefore taken off, and two or three men having laid aside their clothes, mount to the top of the chapeau. The chapeau is so dense that the men can stand upon it for some time; each of the men works a hole with one foot through the crust; he then gets his other foot through, and gradually succeeds with much trouble in causing his body to sink through the crust into the wine below. While thus engaged, the whole chapeau is broken to pieces and worked together with the wine. These men now work the whole of the murk and mix it thoroughly in all directions with the wine for about half an hour. They then emerge from the liquid, covered with a dark red dye, and after wiping their bodies with the shirt they pulled off, they put on a fresh shirt, and re-dress. After the lapse of several hours, the chapeau is again risen as before. During this operation, the men perspire profusely, not only from the intense labor which they perform, but also from the poisonous effect of carbonic acid gas exhaled by the fermenting mass. They are mostly deadly pale or blue; they pant, and hang their heads over the edges of the cuves, gasping for fresh air." J. H. K.

PEROXIDE OF HYDROGEN.

PEROXIDE of hydrogen, known to the chemists as H_2O_2, was discovered by chemists many years ago, but it remained for Mr. Charles Marchand to produce this remarkable substance commercially so as to make it accessible to every home.

The peculiar characteristic of peroxide of hydrogen is its wonderful affinity for all substances capable of oxidation or combustion by a combination with active oxygen at ordinary temperature. All kinds of decomposing substances belong to this class. Dead animal and vegetable tissues and vegetable cells are readily destroyed by it, as the peroxide has the property of giving off nascent oxygen, which is active at ordinary temperatures. These properties give to peroxide of hydrogen a value to the physician and surgeon which can scarcely be estimated. They are possessed by no other known substance which is not at the same time corrosive and destructive to living cells, while the peroxide has no effect whatever upon living animal cells, at least in solutions of the strength ordinarily employed. When a solution of peroxide of hydrogen is poured into an abscess, or applied to a discharging ulcer, a brisk effervescence occurs, resulting in the production of foam in greater or less quantities. This is due to the action of the peroxide upon the pus, which it completely destroys, while not acting upon healthy tissues.

There is no remedy so valuable in the treatment of old ulcers, abscesses, and in all conditions in which a disinfecting agent is required, and in which the use of a poisonous substance such as corrosive sublimate is objectionable. Experience has shown its great value in diphtheria, in the treatment of which disease we shall certainly continue to use it, notwithstanding the recent condemnation of its use by certain physicians who seem to have been actuated by something besides a scientific spirit in their denunciations of this valuable remedy and of its manufacturer.

Thousands of the most eminent physicians are ready to testify to the merits of peroxide of hydrogen, and it is unquestionably one of the most important additions to materia medica that has been made within recent years. The manufacturer has conferred a boon upon suffering humanity, in making it accessible to thousands of people who otherwise might have been unable to obtain it.

J. H. K.

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Bilious Headache.— Dr. Eccles, an English surgeon, recently read before the British Medical Association an able paper on the treatment of what is commonly known as bilious or nervous headache, in which he called attention to the fact that the locality of the headache appears to be identical with a distribution of the nerves connected with Arnold's branch of the pneumogastric. In the words of the author, "The irritation of the gastric fibers is reflected or referred to the sensory fibers of the pneumogastric in the head (auditory branch). In the treatment of a large number of cases of this sort, we have observed, on examination, tenderness of the pneumogastric in the neck, invariably in the side affected the most frequently, and there is usually corresponding tenderness in the region of the solar plexus, or in one or both lumbar ganglia of the sympathetic. Massage is recommended by Dr. Eccles as a salutary remedy in these cases, as he has uniformly observed dilatation of the stomach and deficient peristalsis of the stomach and intestines."

Our observations respecting the frequency of dilatation of the stomach agree very closely with those of Dr. Eccles. We have found, however, the quickest means of relieving nervous or sick headache is lavage to the stomach, which acts with unfailing and almost instantaneous certainty. The majority of patients declare themselves feeling better by the time the stomach washing is fairly completed, and in a few hours are fairly restored to their usual health, although accustomed to suffer many hours, or sometimes days, with the headache, when treated in the ordinary way. J. H. K.

Therapeutic Results of Massage in Structural Disease.— *Merck's Bulletin* sums up the effects of massage in bruises and other traumatic tissue injuries, as follows: —

In *simple contusions*, it brings about the rapid disappearance of divers disturbances, especially pain.

In *contusions of the joints*, it dissipates the muscular reflex contractures or the pareses, but above all it prevents obstinate amyotrophy, which is the most serious of complications.

Applied to *sprains*, it is remarkable for the rapidity of its good effects; the looked-for result is obtained in three or four days.

In *dislocations*, recourse must be had to it as soon as the reduction is assured, as it reduces, in the shortest time, the swelling, ecchymosis, and pain; it arouses the muscular fiber from that local stupor into which it is plunged by the traumatism; and it prevents atrophy and lingering stiffness.

Applied to *juxta-articular fractures*, it soon subdues both pain and swelling; if recourse is had to it after the removal of apparatus, it limbers up the parts and dissipates the œdema. A simple fracture, without deformation of the lower end of the radius, is cured in a fortnight, whereas at least forty days are necessary when immobilization with plaster dressings is resorted to.

Against *acquired amyotrophy*, massage shows itself powerless; if applied in the earliest stages, it may prevent the further progress of the affection.

The clinical conclusions are based on the histological results; a wounded muscle to which massage is not applied presents a diffuse sclerosis, with hypertrophy of the adjoining connective tissue in the various parts, interstitial hemorrhages, engorgement of bloodvessels, and hypertrophy of their outer coat; whereas a wounded muscle, treated with massage, offers a normal histology. This is *restitutio ad integrum*.

The bloodvessels are normal in the muscle to which massage has been applied; in the muscle not so treated, they present a hyperplasia of the external tunic. The nerve filaments, normal in the muscle to

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which massage has been applied, show signs of perineuritis and interstitial neuritis in the muscle not treated with massage.

The lesion of the nerves is more marked than that of the bloodvessels.

Upon the whole, according to the researches made by the author, it is proven, *de visu*, that massage acts by deterging a part of the variously noxious substances which the traumatism has introduced, by bringing the affected part back to its normal state, and by so preventing the process of diffuse sclerosis which would otherwise result.

Abdominal Massage.— When the writer first began the employment of abdominal massage, nearly twenty years ago, this procedure was looked upon with disfavor by the medical profession, who regarded hygienic appliances of all sorts as belonging to the domain of quackery. This excellent mode of treatment, however, has won its way into favor with scientific physicians in all parts of the world, and at the present time no one would think of denying its great value in certain forms of abdominal disorders, particularly those of the bowels and visceral prolapse.

A great variety of procedures have been proposed for the application of massage to this portion of the body, one of the most recent of which is what is known as Sahli's method, which consists of the application to the abdominal walls of a cannon ball with a rolling movement, the patient lying upon the back. Ivanoff has suggested the employment, as a substitute for the cannon ball, of a hollow wooden or celloidine globe partially filled with shot. The use of bags partly filled with shot has also been suggested, and the writer has made extensive use of both the cannon ball and the shot-bag with excellent results. The advantage of this method is, that the patient can use it himself, although of course it can be more advantageously employed by an attendant. The cannon ball and shot-bag are of special service in cases of atony of the stomach and bowels. For the relief of the last-named condition, the most prominent symptom of which is constipation, due to the lack of ability of the muscles of the colon to contract upon the contents of the bowels, the ball or bag should be applied first to the lower part of the abdomen on the right side. It should be rolled upward to the ribs, then across the body, then down upon the opposite side, continuing on in a nearly circular movement. The application is best made before breakfast or half an hour after breakfast.

In cases of dilatation of the stomach, or gastric insufficiency, in which the muscular structures of the walls of the stomach are unable to expel the contents of the organ at the proper time, so that the food, being too long retained, undergoes fermentation, the movement should be similar, but in the opposite direction. The ball, being applied first upon the left side, upon a level with the umbilicus, is moved upward close under the ribs of the left side to the epigastrium, and down upon the opposite side on a level with the umbilicus, continuing the movement as before. To aid the stomach in ridding itself of its contents, the application should be made about three hours after eating. The writer has found this an excellent means of relief in cases in which gastric insufficiency is a marked feature. The shot-bag may be used precisely in the same way as the cannon ball or the hollow globe filled with shot. Manipulations may be made with the hands in such a way as to accomplish the same purposes. For manual massage, however, an attendant is, of course, indispensable.

Abdominal massage is beneficial in a great number of other conditions besides those mentioned. The following are some of the leading therapeutic effects which have been demonstrated as resulting from the proper application of the abdominal massage: —

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1. The contents of the alimentary canal are moved onward.

2. The portal circulation is accelerated, and also the circulation of the lymph in the lymphatic channels.

3. Absorption is stimulated by the increased activity in the portal circulation.

4. The production of gas is diminished, and its expulsion encouraged.

5. The respiratory movements are increased, thus relieving hepatic congestion, and general visceral congestion in the abdomen.

6. The nerves and nerve-centers of the abdominal sympathetic are stimulated, and thus the vital activity of all the abdominal viscera is accelerated.

J. H. K.

Treatment of Myxœdema. — This unfortunate but comparatively rare disease has recently received considerable attention by the discovery of the relation sustained to it by the thyroid gland. Dr. Murray reported recently in the *British Medical Journal* a typical case of this disease, in which almost complete recovery has been secured by hypodermic injections of an extract of the thyroid gland of a sheep. The gland-extract was prepared as follows: Taking the thyroid gland of a sheep just killed, and carefully removing all the fat and cellular tissue, the gland is divided into small morsels. One c.c. of pure glycerine and an equal quantity of a two-per-cent solution of phenic acid are then added. The mixture is then placed for twenty-four hours in a glass vessel closed with sterilized cotton. At the end of this time the mixture is compressed in linen cloth previously immersed for some time in boiling water. In this manner, about 50 drops of a turbid, rose colored liquid are obtained. Half of this quantity is immediately injected, and the rest, at the end of a week. It is thus necessary to prepare a fresh liquid each week. The injections are first made every week, then at longer intervals. J. H. K.

An Anti-spitting Association.— Spitting, except in a proper receptacle, should be prohibited by law in all public buildings and such public carriages as omnibuses, street-cars, railroad-cars, steamboats, etc. Modern science has shown that sometimes potent causes of disease and death are communicated by germs which are found in the expectorated matter of persons suffering from infectious maladies. For example, pneumonia, diphtheria, and consumption, three of the most deadly diseases, which are responsible for fully one fourth of the deaths that occur in thickly settled districts of civilized countries, are always communicated by germs found in the sputum of patients suffering from these diseases, and are doubtless communicated through the diffusion of the particles of dried sputa, which, being deposited upon the floors of lecture rooms, churches, street-cars, and omnibuses, and upon the street pavements, become dried, and are ground to dust, and then whirled into the air as minute motes, which dance in the sunbeam and carry disease and death to those who unsuspectingly inhale the germ-laden air. These deadly germs can be found in the air of almost every church, opera house, or lecture room, and their presence has also been demonstrated in the air of sleeping-cars. The State of Pennsylvania has prepared and widely circulated a little notice setting forth the dangers of spitting, which has been posted in every schoolhouse in each city, and the teacher requested to call attention to the evils which it points out, at least once a week. The example is a good one, and ought to be imitated in every city in the land.

The measure taken for the suppression of the spitting nuisance above referred to, was the result of the active effort of an association formed by the ladies of Pittsburg, under the leadership of Mrs. J. M. Oakley. It might be called the Anti-spitting Association, as it is giving special

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attention to the suppression of this public evil, the dangers of which are yearly becoming more conspicuous.

We are glad to announce the addition to our list of distinguished collaborators, of the name of Prof. E. Meinert, M. D., of Dresden, who will contribute at an early date, a very valuable and interesting article on the Anatomy, Methods of Investigation, and Etiology of Enteroptosis. The subject is one of very great interest, especially to American readers, to whom it is comparatively new, and we are glad to be able to present the subject to our readers from the pen of so able and original an investigator as Dr. Meinert. It is also a pleasure to us to know that the results of the interesting studies made by Dr. Meinert within the last few years, relating to this important question, agree entirely with our own results, which have already been published. There is, perhaps, no question relating to practical therapeutics which has a more vital and direct bearing upon the every-day work of the physician than this.

J. H. K.

REVIEWS.

Eighth Biennial Report of the Illinois Eastern Hospital for the Insane, Kankakee.— This volume, the chief part of which consists of the biennial statement of the medical superintendent, presents a model report of a model asylum for the insane. Dr. Richard Dewey, the well-known medical superintendent, has in its organization erected a monument to himself in this model institution for the treatment of the insane. Instead of massing patients together in one large building, and subjecting them to a course of treatment which might fairly be termed "meditation on death" or on chronic lunacy, the Kankakee asylum is organized on the cottage plan, the patients being gathered in families of from forty to sixty and classified as far as possible. Here they receive the benefit of the most advanced rational methods for the treatment of the various forms of nervous and mental maladies from which they are suffering.

The great State of Illinois has reason to be proud of the grand Hospital for the Insane, at Kankakee, and it is to be hoped that the labors of the man who has been chiefly instrumental in creating this admirable institution, are sufficiently well appreciated by his fellow-citizens, and especially those who have recently assumed the reins of government, to enable them to disregard the opportunity for displacing him by a man of lesser worth and ability. Nothing could be more antagonistic to all ideas of propriety and justice than the removal of so efficient a public officer, simply for the purpose of filling his place by a man of political affiliations. Such a man as Dr. Dewey is above politics,— a fact which it is to be hoped the new democratic governor of the State of Illinois will recognize.

Uber Enteroptose.— Concerning enteroptosis, or intestinal prolapse. By E. Meinert, M. D., Dresden. This brief paper consists of a note communicated to *Der Gesellschaft fur Natur und Heilkunde*. Dr. Meinert has made extensive investigations upon the subject of enteroptosis, or intestinal and visceral prolapse, and published in connection with his note a large number of interesting observations, which will be given to the profession in the near future. The subject is one that has been greatly neglected, and the thanks of the profession are certainly due to Dr. Meinert for his painstaking investigations.

A National System of Sanatoria: A Plea and a Prophecy.— By Samuel S. Wallian, A. M., M. D., of New York. The author has evidently had no great experience in the management of Sanitariums.

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PROF. ROBERT KOCH.

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MODERN MEDICINE

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BACTERIOLOGICAL WORLD.

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ORIGINAL ARTICLES.

"HONOR TO WHOM HONOR IS DUE."

KOCH AND HIS DISCOVERIES.

BY DR. FREDERICK GAERTNER, A. M.,

Pittsburgh, Pa., U. S. A.

I RECENTLY had the good fortune to make the acquaintance of Prof. Robert Koch, of Berlin, Germany, and was not only able to observe with great pleasure and profit a little of the brilliant work of this great scientist and bacteriologist, but had occasion to work with him in his private laboratory, and under his personal observation and instructions.

Dr. Robert Koch was born at Clausthal amid the Hartz mountains, Dec. 11, 1843, the son of a higher officer of the mines. He first graduated at the University of Gottinger. It was not his fortune, at the completion of his medical studies at the university, to devote himself to specialties; but after taking his degree, he established himself in a village near Hanover, and began his work as a general practitioner. After a few years he removed to Rockwitz, a little malarial town in Prussian Poland, which he subsequently deserted for Wollstein.

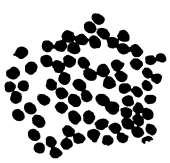

FIG. 1. — Staphylococcus of Suppuration.

Meanwhile he studied and experimented. The microscope was his principal aid, and he conducted in his quiet retreat a series of bacteriological studies which drew to him the attention of learned men such as Virchow, Rokitanski, Recklinghausen, and other pathologists. It was in 1880 that his name came so prominently before the public as an expert, in connection with the famous Speichert poisoning case. The conviction of the prisoner in this celebrated case was entirely owing to the remarkable analysis and medical testimony of Dr. Koch. His profound erudition attracted wide attention, and he is now considered at the head of the medical profession and the founder of bacteriology.

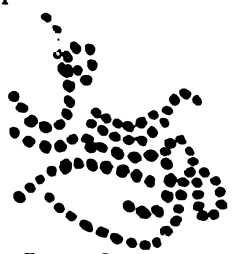

FIG. 2. — Streptococcus Pyogenes.

FIG. 3. — Bacillus Tuberculosis.

Though in every phase of bacteriological activity Prof. Koch evinces the distinctive factors of the accomplished scientist, expert microscopist, pathologist, and bacteriologist, *facile princeps aqualium*,

FIG. 4. — Tuberculosis from Fresh Mucus. (Magnified 400 Diam.)

perhaps in his laboratory and study he appears in his most imposing and felicitous attitude. To his magnificent and

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genial presence and his impressive composure, nature has added a ready and distinct articulation, which imparts an authoritative emphasis and conviction to his speech. His descriptions of morphological changes, of functional derangements, or of bacteriological and microscopical

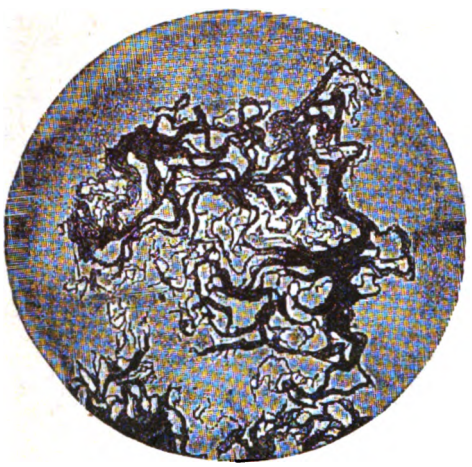

FIG. 5. — Tuberculosis after 14 Days.

technique, profound in expression, based upon the highest scientific principles, are always characterized by terseness of expression and marvelous significance. While in simple language enforcing the most scrupulous attention to the common details of an experiment, preparatory, concurrent, and subsequent, he ascends to the heights of generalities, in which regions his discourse often sparkles with the scintillations of brilliant and forceful pathological and bacteriological aphorisms.

Such being the habitual manner and method of Prof. Koch, it is not a matter of surprise that his laboratories should be sought by thousands of visitors, spectators, auditors, physicians, pathologists, and especially microscopists and bacteriologists, his great fame elevating him to a position beyond the reach of jealousy.

In 1879 and 1880, Dr. Koch made some remarkably accurate studies in septicæmia, commonly called blood-poisoning. (See Figs. 1 and 2, representing the staphylococcus of suppuration.) He has not only demonstrated, but forcibly proven, that these germs are the direct cause of suppuration.

In 1882, Prof. Koch first made his discovery, that all tuberculous diseases are due to a bacillus, commonly called a germ, or microbe, which he called "tubercle bacillus." (Figs. 3, 4, and 5.) The general practitioner scarcely asks how Dr. Koch made his discovery, but in this method of Koch's, lies the great cause of amazement and admiration. He modestly attributes the result of his studies to the perfection of the microscope; but the best microscope would be useless were we not in possession of Koch's methods of staining, isolating, developing, and inoculating. He ascertained and demonstrated how to provide fostering soil for the minute beings; he understood how to regulate the confusion existing in a single drop of matter, pus, or virus, so that we are able to separate and develop any certain kind, and study it both in its simple and complex states. Figs. 6 and 7 show how he produces a culture of these germs in test-tubes. Dr. Koch has gone one step farther: he first revealed to us the enemy, but was unable to destroy it; now he has accomplished even this; that is, his *tuberculin Kochi* does not destroy a tubercle bacillus at the first blow, as was anticipated by the unscientific laity, but it has been demonstrated beyond all doubt that by his methods of inoculation and injection, in animals as well as in

FIG. 6. — Culture of Cholera Germs.

FIG. 7. — Culture of Tuberculous Germs.

human beings, this *tuberculin Kochi* produces a chemical change and a favorable condition of the system; that is, in the chemical elements of the blood, and also in the chemical constituents and physio-

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logical functions of the tissues in which incipient tuberculosis seemingly exists, *i. e.*, in which tubercle bacilli are found.

I will here explain how preventive inoculations and injections are supposed to do their work. These are based upon the experiments and observations of Koch, Pasteur, Metchnikoff, Friedlander, Lœffler, and other scientific bacteriologists, whose theory is that every infectious disease is produced by a certain germ. These germs, microbes, or bacilli are introduced into the system by way of the alimentary canal, the rectum, through the lungs, or even through the skin. Now, to have each germ produce its specific disease whenever introduced into the system, it must first have a favorable and fostering soil; secondly, only under the most favorable physiological conditions is it possible for each variety of germs to produce its specific pathological condition; thirdly, the chemical elements of the blood and tissues must be such as to act as a favorable, fostering, and developing soil for each specific variety of germs, which, of course, is easily effected by chemical preparations, heat, cold, and the various curative and preventive inoculations and injections, be it that of *tuberculin Kochi* for tuberculosis, Pasteur's injections against hydrophobia, or vaccine vaccination against smallpox.

Practically, all the injections, inoculations, and vaccinations produce a specific modified intoxication and contamination of the entire system, especially the blood of this certain specific disease of which the germs have been injected, only in a mild, attenuated, and modified form, which is quite sufficient to produce in the system an unfavorable, unfostering, undeveloping soil for each specific germ in its concentrated form when so introduced. It acts as a preventive, that is, the system resists these concentrated germs simply because the soil (the system) is unfit for their development. Therefore, in all respects, we must highly recommend preventive inoculation, injection, and vaccination. But for what period these inoculations, injections, and vaccinations hold good, that is, keep the system in an unfostering and undeveloping state, remains yet to be determined by scientific researches and observations.

And now comes his greatest discovery, — another triumph of science, when Koch placed himself at the head of the German Cholera Commission which was sent into Egypt and India; and there, where he first unmasked this hidden enemy to mankind, — the comma bacillus (Fig. 8), commonly called the cholera germ, — he received the highest reward ever bestowed upon a physician or a scientist, an honorarium of one hundred thousand reich marks; and upon his return to Berlin, the German Government acknowledged his deserts by conferring upon him the rank of Privy Councilor, and the rectorship of the Imperial Institute of the "Kaiser Wilhelm's Universität zu Berlin, and the German Government."

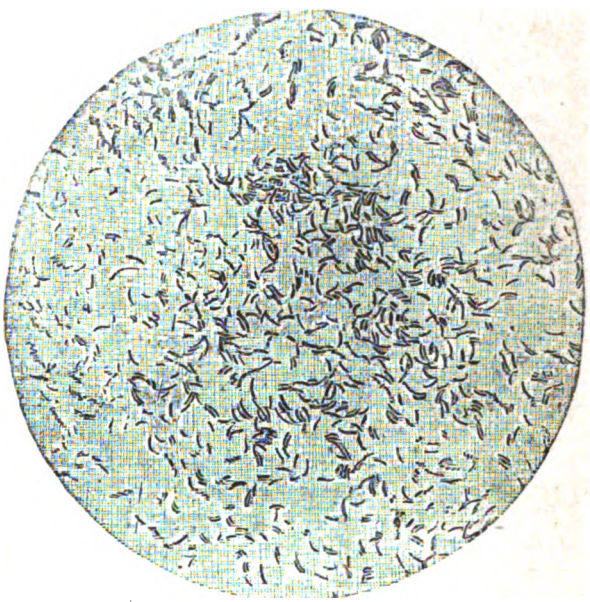

FIG. 8. — Comma Bacilli. (Magnified 500 Diam.)

INFECTIOUS ABORTION IN MARES.

BY T. J. TURNER, B. A., D. V. S.
State Veterinarian of Missouri.

IN response to the Governor's letter of May 16, 1892, ordering me to visit the State of Montana, and investigate a troublesome malady then affecting brood mares, especially those owned by one Marcus Daly, of Riverside, Bitter Root Valley, Montana, I immediately started on

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the trip, and arrived at the Daly ranch on May 24. An investigation was begun in a few days, which required about four weeks to consummate. The following is my report upon this subject, containing a history of the outbreak, its nature, and salient points pertaining to the proper management of the trouble, should it occur on any farm ; also facts ascertained by experimentation, leaving out the more minute details concerning the parasite, which are yet to be determined by investigation.

Location of Daly Ranch.— The Daly ranch is situated in the fertile valley of the Bitter Root, in Missoula county, Montana. The grounds are generally high and well drained, the tillable land being in a high state of cultivation. Much money has been expended on the property to make it a first-class breeding establishment. Many thousand (some 30,000) acres are inclosed within its confines. The climate is perfect, and feed first-class, as is also the management. To diverge slightly from the object of this report, I am constrained to say that the location of the ranch, its soil, and the climate of the country have nothing whatever to do with the cause of the malady.

History of the Outbreak.— Infectious abortion (so called) was first manifested on the ranch, according to facts attainable at that place, about the middle of February, 1892.

To preface the subject, it might be well to state that the malady, whatever its nature, was causing the mares to slip their foals, either by abortion or a premature birth. It was first noticed among the trotters of the Daly ranch, the renowned mare, "Fannie Witherspoon," being the first to abort. The trouble ran riot through his entire stud of most valuable animals, of both thoroughbreds and trotters. The first few abortions caused but little alarm, the owner thinking they were the result of some accident. This being the case, the mares known to have aborted were not regarded as specially dangerous to those still carrying foal, and were consequently allowed to pasture with them. Later, however, alarm was taken, but not until too late, for nearly all the mares in foal had been exposed. The abortion continued until the last of May. Before I reached the locality, the mares were constantly, as they aborted, removed from the ranch, and kept isolated for two or three weeks.

The disease was of an enzoötic nature, no animals save those belonging to Mr. Daly being affected. Thus it will be seen that this disease may be comparatively easily controlled, although of an infectious character.

Concomitant with this abortion, a few mares would carry their foals to nearly full term, and then premature births would occur. Several foals lived, and apparently, for a week or ten days, were perfectly healthy, when it would be noticed that the joints of the little fellows were swollen, and there was general dejection.

The possibility that the same cause was in operation in producing the two maladies, at once presented itself for consideration. Upon this general supposition, the investigation in regard to abortion was made. The result will be seen in a history of the experiment.

Etiology.— At first, the trouble was supposed to be caused by the food on which the animals were fed. Investigations were made, but no agents likely to cause abortion were found. These investigations were made by botanists and men thoroughly capable of doing such work. They were employed by Mr. Daly, who has been extremely anxious to fathom the trouble, and has used all available means to do the same. He has spared no expense, and too much credit cannot be given him for his kindly and generous aid to science in fathoming the cause of this malady.

Prior to this, however, it was supposed that the animals might be aborting from sympathy : then it was that those having aborted were immediately separated from the mares in foal. Mares and cows frequently abort through sympathy, it seems, and no infection exists. Upon arrival, and prior to it, indeed,[1] infectious abor tion was suspected, and the investigation was begun with that idea in mind. Having arrived late in the foaling season, few mares were left to foal. This, however, was not a great disadvantage, for a few days after arrival, a sorrel mare, Biddy Mac, running on a mountain range, gave

[1] Dr. Halloway, State Veterinarian, had secured the services of Dr. Paul Paquin for Mr. Daly, and they had made researches which led them to conclude that it was infectious abortion. Later, Dr. Paul Evans was secured to continue the investigation begun by the former. His work, not yet published, conforms to the views of Paquin and Halloway.

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birth to a foal, which, as far as external appearances were concerned, was perfectly healthy, except that it was extremely weak. Being very young, however, no trouble was anticipated from this cause. In all these cases the fœtal membrane was always abnormal in appearance.

Appearance of Membranes when Found. —The membrane of this particular case, when found in the morning after the labor (upon a hill-top), and a close and minute examination made, revealed the following facts: That portion of the membranes accompanying the horns of the uterus, was found to be undergoing decomposition, having a deep red, congested appearance, this followed by a leaden greyish color later, and exhaling a very sanious odor. Small patches of the membranes were entirely destroyed, and small quantities of a muco-purulent matter were to be found. From these membranes, septic material was obtained for future use for experimental purposes. The method will be found hereafter in "History of Experiment and Result so far as Ascertained," the direct operating cause being a microscopical parasite, with its classification not yet definitely determined; the life, history of the parasite, and its habits, are yet also to be determined.

Symptoms. — In this trouble — infectious abortion — no symptoms save those premonitory signs, as a possible uneasiness noticed in simple abortion, are noticed, and most frequently nothing at all is to be seen. However, in the joint affection, due to the same organism which caused abortion, as shown by investigation hereafter noted, affecting the foal which lived, the following symptoms were noticed: About a week or ten days after the birth of the foal there was a swollen condition of some of the joints of the limbs. These increased in size, and became very painful. They often ruptured and a muco-purulent discharge escaped. Usually, however, there was no rupture, but a continuous distention of the synovial sac. Upon manipulation, these swellings were found very tense and feverish, the little fellows, with a most dejected look, stood or reclined alternately, moving around very little, on account of the extreme pain caused by any motion whatever. A severe synovitis, at times partaking of a suppurative character, was established, and upon post-mortem examination the entire epithysis would be found denuded of cartilage, so severe had been the suppurative action. The appetite seemed tolerably fair in most cases, yet there was no thriving, the hair looked dead and rough, the animal itself having little life and scarcely any vitality.

Course and Determination.—The mares, after inoculation, abort in about fifteen to twenty days. The foals born alive from inoculated mares invariably die, though some live for two or three months.

Treatment-prophylactic.— In regard to the treatment of mares having aborted, the following measures should be followed: —

1. If the mare aborted in an open paddock or pasture, the fœtus and fœtal membranes should be burned, and the mare taken to a stable or small lot where she can be easily treated.

2. If the mare is removed to a stable, it must be apart from any other stable containing pregnant animals, and must not be on high ground, the urine of which will run into lots, paddock, or field occupied by pregnant animals; if removed to a small lot, the lot must be low or situated in such a place that no pregnant animals will by drainage be exposed to the germs causing the trouble.

3. (This third measure is only necessary in mares that have aborted and are not doing well.) The external parts should be thoroughly cleansed with a solution of hydrargyrum bichloride (corrosive sublimate), 1 part to 1000 parts of water. The tail itself should be thoroughly washed with the same, or if in fly time, a solution of carbolic acid may be supplemented to the corrosive sublimate, of the strength of one part of acid to 100 parts of water. This having been done, the vagina and uterus should be thoroughly cleansed with injections of pure tepid water. After this, use the solution above mentioned for injections per vagina. Continue these injections once a day for two or three days.

4. The attendant treating mares should thoroughly disinfect his hands, and if possible change his clothing before he goes into the presence of pregnant animals.

5. The mares, after two or three weeks of treatment, may be allowed to the stallion with safety.

6. The foals affected with joint-ail (it being the same disease differently main-

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fested and capable of producing abortion) should be destroyed, and their carcasses burned.

7. If, however, the foal is suffered to live, it should be separated from pregnant animals, before any of the swellings exhibit suppuration or sores.

8. A mare, the dam of a foal suffering from the joint-ail, should undergo the same antiseptic treatment as though she had aborted, providing she is not doing well.

9. Mares that have aborted and done well should not be allowed to stallion sooner than two or three weeks after the accident.

History of Experiment and Result so far as Ascertained.— A few days after arriving at the ranch, June 25, "Biddy Mac," a trotting brood mare, gave birth to a foal. This foal, previously mentioned, was very weak, and died from starvation in two days after its birth. A post-mortem examination was held, but nothing could be found sufficient to cause death. The udder of the dam was then examined, and no milk found. Cultures were made from the blood and several of the glands of the colt, to see if they might possibly contain any of the germs causing the trouble. It is not intended to give the results in detail, as many of the minute points were only tedious and of no practical value to the general public.

Cultures were made from the diseased fœtal membranes from "Biddy Mac," and inoculation made therefrom. One bay mare in foal received the inoculation on June 6, and on the following night she foaled. On June 29, the foal showed signs of joint trouble in right knee, and on July 1, the hock joint was as large as a man's head. Thus, from this experiment, almost just begun, we might say, do we produce the disease in a colt that when born was apparently in health, and that, too, after the inoculation had only been introduced a few hours.

Another mare, a dunn, inoculated with a culture from the blood of Biddy Mac's colt on the 20th day of June, gave birth to a dead foal. This was an abortion, as evinced by the diseased placenta. Hence we see that from these two inoculations with culture, we have produced both the diseases, abortion and joint trouble. The germs causing these two diseases are the same, as shown under the microscope. That these two maladies are one and the same disease differently manifested, there is no doubt.

Other and more varied experiments were tried, and are still in progress, concerning other matters with reference to the possible nature of the malady in regard to immunity and length of incubation after natural exposure. The investigation in these lines is not yet consummated, and much time and attentive work must be done ere the public receive any further statements.

From the foregoing it will be seen, that antiseptic measures in the way of washes, etc., in treating mares that have aborted, are not sufficient, and perhaps of doubtful benefit, the germ causing the malady being in the system and not a local parasite; that strict sanitary measures are necessary; that medicinal treatment, of whatever nature, will be of no benefit so far as removing the cause or preventing the accident is concerned; that joint-ail and abortion are the same malady differently manifested; that local application to umbilicus of a recently born foal whose dam has been infected previous to foaling, will not prevent the occurrence of joint-ail in colts.

The following facts may be determined by experimentation: —

Whether one attack gives immunity to another the succeeding year; whether we will or will not be able to vaccinate against its appearance; what is the length of time required for incubation under natural or accidental exposure; whether or not the germ is capable of producing abortion save at certain stages in its life; and what is the length of time during which the germ remains in the animal economy.

TYPHOID FEVER IN THE LIGHT OF MODERN RESEARCH.

BY L. BREMER, M. D.,
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Introductory Remarks.— When, under the stimulus of the cell-doctrine, the pathological anatomy of typhoid fever had been settled to the satisfaction of the inquiring medical mind, a great step, and in the opinion of some, a final one, had been taken toward the understanding of the nature of that disease. Of course there was still that intangible, mysterious something, the air and the soil in their varying conditions, which baffled the in-

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vestigators of those times, and hovered over the minds of the hygienists and practical physicians as the Kismet does over the Turk. The pathological anatomy was well understood; but what was the ultimate cause of the histological changes peculiar to the lesions found in the typhoid, and what gave rise to the variegated symptomatology of the disease? This was the question of questions which engrossed the minds of pathologists and epidemiologists of that period of medical history which preceded the bacteriological era.

The enthusiasm which arose, not only in the medical laboratories, but among the educated of the civilized world, in the beginning of the eighties,— the springtime of bacteriological research,— when, together with many other pathogenic microbes, the bacillus of typhoid fever was discovered, can be fully appreciated by those who, though in a modest way, participated in the movement, and shared the hopes it awakened as to the reach and ken of the physician of the future.

Very naturally it was presumed that, once the causes being determined and located in these vastly preponderating diseases of afflicted humanity,— the infectious,— it would be a step of less difficulty to find the agents endowed with the faculty of destroying those causes.

At that time it was considered a great triumph of progressive science to discover a new coccus or bacillus in a given infections disease. The specific microbe having been determined, the next logical step was to seek out such chemical substances as were most incompatible with the lives of the several species of cocci and bacilli, and thus to lay the foundation of the "only rational" method of treating infectious disease. The watchword, "antibacterial therapy," was then heard for the first time.

But the hopes founded on this new departure gradually dwindled down; and how the pessimists had in this, as in other matters generally, once more the better of the enthusiasts, I need not particularly emphasize before a body of medical men, most of whom have watched with interest the developments in the history of our science during the last twelve years.

Practical tests showed that antibacterial therapy, with the sole exception of surgery and, though to a lesser extent, dermatology, did not materially affect the results of treatment, and what was particularly discouraging to those who looked hopefully forward to a speedy achievement of cure and prevention in infectious diseases, was the fact that by the mere finding of a specific and pathogenic bacterium, only a very slight advance had been made toward arriving at a knowledge of the true nature of the disease, especially of the manner of its spread, the channels of infection, the local and temporal conditions favoring or hampering and preventing its development, etc.

It was found that a bacterium, which, by common consent, had been recognized as the exclusive visible etiological factor of a given disease, was far from presenting the same morphological and biological characteristics which the discoverers had established and described; and that the teaching of the oft-insisted-on constancy of form, life-habits, and pathogenic effect had to be considerably restricted in the course of time, with the broadening of the light shed by experiments and counter-experiments on these questions. Much that had been proclaimed as incontrovertible fact, did not withstand the test in the crucible of clinical, and especially epidemiological observation.

The conviction had not in those times settled so firmly as to-day, on the minds of investigators, that what is true *in vitro* in the test-tube and the flask may not be true in nature.

The *insufficiency* of the results obtained so far in the laboratory, for the purpose of clearing up the heretofore mysterious features of infectious diseases, applies in a peculiarly forcible manner to the history of typhoid fever investigation during the past decade; but I hasten to add, that in spite of disappointments in some directions, there is perhaps no other disease where painstaking and untiring labor has met with such brilliant scientific, and in some instances, surprising and eminently practical, results.

Effect of Eberth's Discovery on Formerly Prevailing Notions.— After the bacillus, which is now recognized by the overwhelming majority of authorities as the exclusive morbific agent in the typhoid fever process, had been discovered by Eberth,[1] Pettenkofer's theory seemed to

[1] It is very questionable whether the one described previously by Klebs is identical with the one now regarded as specific.

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have been deprived of its mainstay; and the tide of clinical evidence tending to show the simply contagious nature of typhoid fever, seemed to have gathered sufficient force to sweep off the grounds of scientific medicine a structure which had been erected and finished by untiring energy and wonderful ingenuity.

For years previous to Eberth's discovery, clinicians, restive under the therapeutic, and, in a measure, prophylactic nihilism, which the prevailing epidemiological notions indirectly implied, had been at work to undermine Pettenkofer's edifice by the force of argument based upon the facts gathered at the bedside and in the surroundings of typhoid fever patients. The demonstration of Eberth of a bacillus found invariably in the organs most affected by the morbid process in every case of typhoid fever, seemed to furnish the missing link in the chain of those arguments.

Inadequacy of Bacterial Demonstration. — But the simple demonstration of a bacillus in all cases in which the clinical picture was that of unequivocal typhoid fever, though accounting satisfactorily for the pathogenesis of the disease as such, fell far short of explaining all the problems, which, in the course of the histories of epidemics, had presented themselves for solution, and which, since the discovery of the microbe, were constantly multiplying.

Pettenkofer's Theory. — Above all, there was the remittent character of the epidemics which called for a factor back of the bacillus, and which seemed to be felicitously furnished in the form of the hypothetical, local, and temporal predisposition. After the germ, formerly only a logical postulate of Pettenkofer, had been found, it remained to be proven that under certain atmospheric conditions coupled with a low level of the ground water, the bacillus not only underwent a maturing process, necessary for a successful invasion of the human organism, but also that it was dispersed throughout the atmosphere in order to reach its victims. This proof has never been furnished. Besides, many of the phenomena which formerly were utilized by Pettenkofer in favor of his theory, have been interpreted by modern observers in an opposite sense. It seems, therefore, that, as in cholera, so in the typhoid question, one after another of Pettenkofer's arguments have to yield to the doctrine of contagion as against that of the miasmatic origin of disease, in spite of the fact that bacteriology in its present state is still very far from explaining everything, and that we are still in absolute darkness as regards some of the most vital points touching the question under discussion.

Morphology and Biology of the Typhoid Bacillus. — In order to have a proper appreciation of the difficulties barring the road to exact knowledge, but at the same time, of the palpable and demonstrable results which have been obtained through the study of Eberth's microbe, a short account of what we know of its forms and life habits may be in order at this place.

Polymorphism. — Unfortunately, the most elementary of all criteria, its form, offers nothing characteristic. It looks like many other bacilli, and, what is worse, varies very much according to the media on which it grows. This polymorphism it shares with many water and ground bacteria, and with a number that are normal inhabitants of the intestinal tract. The one most frequently met with, and with which it is most apt to be confounded, is the *bacillus coli communis*. The ends are rounded off, so that a short specimen of the microbe may give the impression of an ovoid-shaped coccus. Under some conditions it develops seemingly into threads, which on close inspection, however, are found to consist of a continuous chain of bacilli.

Motility. — Their motility is effected by vibratile cilia (flagella), of which the fully developed bacillus possesses from three to six, or more. The larger individuals have a snake-like motion.

Nutrient Media as Affecting the Growth of the Microbe. — Like many other similar-looking bacilli, it grows in gelatine at ordinary temperatures, without liquefying it. Hitherto it has been held that its growth on potatoes is quite characteristic. But a close research has demonstrated that the thin, glistening, almost invisible film which covers the potato, is produced by other bacteria likewise; and that, when the surface of the potato is rendered alkaline, a yellowish brown covering results. If to this uncertainty of the potato culture, which up to a short time ago was held to be absolutely diagnostic, is added the fact that Koch found five bacilli which in all respects are similar to, or even

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identical with (excepting their pathogenic properties), the typhoid germ; and that Kitasato, a Japanese physician, and one of the ablest and most reliable observers of Koch's school, has a list of sixteen different bacteria, all of which may be easily confounded with our microbe; it becomes evident how perplexing may be the task of demonstrating the presence of the typhoid bacillus under certain conditions; when, for instance, water or solid substances are to be examined for the typhoid germ. Of course, there is little difficulty in determining it when the material for examination is taken from the living body or from one of the organs in which it is known to form colonies by preference.

Organs Harboring the Bacillus.—These organs are, besides Peyer's patches, the spleen, liver, and mesenteric glands. Here the bacilli congregate and entrench themselves; only occasionally are they found in the blood. I myself have examined the blood of six patients without being able to demonstrate their presence either microscopically or by culture. By tapping the spleen with a hypodermic needle, they have been found by several investigators in the blood thus obtained; as a diagnostic means, however, the spleen puncture does not, as a matter of course, recommend itself. Sometimes they are found in the brain and spinal cord. One observer claims to have discovered them in the roseolar eruptions which, he says, are the result of bacterial capillary embolism. This observation has not been verified. In two cases which I examined, no bacilli could be demonstrated. More probably the roseolar spots are the result of the action of toxic materials circulating in the blood.

Difficulties in the Way of Investigation.—But the chief difficulty barring a successful study of the typhoid bacillus, lies in the utter absence of any animals spontaneously susceptible to the disease. Rabbits, guinea-pigs, rats, and mice have been inoculated; and in isolated instances the characteristic lesions in Peyer's patches were the result of such inoculations with pure cultures. But generally there was no infection, merely a toxæmia,[1] which made the animals sick or killed them. And it is not the typhoid bacillus alone which possesses the power of producing both intoxication and ulceration of Peyer's patches in animals. There are many ordinary water and ground bacteria that are not known as having pathogenous power, and yet they yield the same result when introduced into the circulation of animals.

It seems, however, that of late, white mice have been successfully infected by some French experimenters. The introduction of typhoid bacilli direct into the duodenum analogously to Rietch's and Nicati's experiments with the cholera germ, seem to have been negative.

Variation in Virulency of the Bacillus.—Another great obstacle to obtaining uniform results is the changeableness of the virulence of the typhoid microbe. When bacteriology was still in its infancy, the notion prevailed that there was not only a constancy of form, but also a constancy of virulence, in the various species of pathogenic and other bacteria. In fact, this was one of the fundamental doctrines in the new science. Pasteur was the first to do away with the latter error, and today there is nothing so well established, but at the same time so confusing and leading to contradictory results in experimenting, as the variability of microbian virulence.

The typhoid bacillus is no exception to the rule, but may, on the contrary, be looked upon as a paradigm. Just as the cholera vibrion may be changed from an exceedingly poisonous to a perfectly harmless state, and vice versa, so the typhoid germ is able to acquire and lose pathogenous properties, by varying surrounding conditions.[2]

[1] In a true infection the bacteria, when introduced into an animal organism, develop and multiply, and the number of germs is, theoretically at least, of no importance. A toxæmia will result secondarily from the poisonous products secreted by the pathogenic germs. In toxæmia, pure and simple, it is the amount of bacteria together with their poisonous secretions, that determines the result; absence of any effect, or intoxication followed or not, by death. In toxæmia, then, the microbe may be found in the blood during life or after death; but it has been simply preserved, though perhaps in a viable state.

[2] To make this unstableness of poisonous properties of the lowest forms of plants, the microbes, comprehensible, analogous examples in higher plants are generally adduced to the text-books on bacteriology. The bitter almond is in every respect like the sweet almond, and the bitter almond tree has been shown to be the parent of the sweet variety; but there are the well-known poisonous properties of the bitter, which is the only difference between it and the sweet almond. Another example is found in foxglove. When Linnæus visited Lapland, he was astonished to see the natives eat this plant made up as salad. He ate of it himself, and found that what is regarded as one of the most poisonous plants in the moderate zone, especially in mountainous regions, is perfectly harmless and used as a vegetable in the extreme North. Perhaps the variability of typhoid fever epidemics as to morbility and mortality, is to some extent attributable to the changeableness of virulence in the bacillus, although this is certainly not the only factor capable of explaining it.

(To be continued.)

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

THE LIVER AS A BLOOD GLAND.

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Translated by J. H. Kellogg, M. D.

THE ancients regarded the liver especially with reference to its relation to the blood. Struck by its special relation to the liver, and the great volume of blood which enters and departs from it, they considered the liver as an abdominal heart, and Galen maintained that the liver was the organ in which the more refined portions of the blood were elaborated. He even held that the quantity of blood produced by the liver was so great that a disturbance of its functions gave rise to the gravest maladies.

You will also find a trace of this theory concerning the liver in the Talmud Bekhoroth, one of the twenty-one treatises on the Talmud of Babylon. One of the characteristic phrases used, is this, from Rab Khahana, "The liver is the source of the blood."

Not only were the ancients acquainted with the importance of the circulatory system, but they were not ignorant of the intimate relation which exists between this circulation and hemorrhoids, to which they gave a very important role. They maintained that the sudden disappearance of hemorrhoids provoked grave symptoms, a fact which you will find many times cited in the works of Hippocrates. Then came a period in which the liver was considered a useless organ. But in the seventeenth century, Stahl contended against this opinion, and attached great importance to disturbance of the portal circulation.

We will study first the circulation of the blood in the hepatic gland, then the modifications which the blood undergoes in traversing this gland. You will see, later, that this study is necessary, if one desires to understand the role played by congestion of the liver, either as a primary affection or as a secondary disorder. It is only after having made a very careful study based upon the most recent physiological discoveries, that we shall be able to judge the true role which hepatic congestions play in infectious or other maladies in which this congestion appears.

In order to understand the anatomy of the hepatic circulation, it is necessary to review briefly the study of the hepatic lobule. It should not be forgotten that the conception of the hepatic lobule which was entertained by Hering and Kiarnan has been profoundly modified in recent years by the works of Sabourin. Hering took for the basis of the lobule the blood-vessels which it received. This polyhedric lobule presented at its base the afferent veins which empty into the hepatic veins, while, on the contrary, the central vein of the polyhedron belonged to the portal vein, and entered the vascular network established between the veins of the periphery and the central veins.

Sabourin, basing his views upon the results of investigations in pathological anatomy, abandoned the idea of hepatic lobules for that of biliary lobules, taking for the basis of his system the biliary ducts rather than the afferent or efferent veins. The accompanying figure indicates very clearly the scheme of this theoretical conception of the biliary lobule. At the base of this lobule is found a biliary duct (b), a terminal branch of the portal vein (p), and one of the terminal branches of the hepatic artery (a), while, on the contrary, at the periphery of this biliary acinus are found the branches of origin of the hepatic veins. Leaving the periphery of the biliary acinus, the efferent veins pass on to empty into the inferior vena cava. They cross the liver directly, and are distinguished from the portal vein by the fact that, being adherent to the parenchyma of the liver, they remain open when the tissues are cut; while, on the contrary, the branches of the portal vein protect the body of the capsule of Glisson which envelops them, and collapse after a section. Finally, we should add that the hepatic veins, like the portal veins, are devoid of valves.

It is not necessary to dwell here upon the origin of the portal vein. You know that the three great veins which contribute to its formation, are the splenic, the superior mesenteric, and the inferior mesenteric. The union of these three great veins at the border of the head of the pancreas, forms the trunk of the hepatic vein.

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All the blood distributed in the intestinal mucous membrane passes through the liver by the portal circulation. It is necessary to note here, also, that there exist some accessory portal veins which Sappey described in 1859, and which are divided into five groups, to which he has given the following names: Gastro-hepatic, cystic, nutrient veins, veins of the suspensory ligament, and umbilical or paraumbilical veins.

To this portal circulation, which constitutes the dominant fact of the liver as a blood gland, it is necessary to add the nutrient vessels which are furnished by the hepatic artery. The absence of valves in the portal vein, the absence of surrounding muscular masses, aiding by their play the movement of the blood, the presence of a capillary network to be crossed in the interior of the liver, and finally the vertical arrangement of all the vascular network, are so many circumstances which oppose the passage of the blood from the intestine to the inferior vena cava. But to these causes which hinder the circulation, it is necessary to oppose those which, on the contrary, favor the course of the blood. The one which is certainly the most important of all others, is the respiration, which acts in two ways: In the act of inspiration the diaphragm is lowered, thus compressing the entire abdominal mass, and so causing the blood in the abdomen to pass toward the vena cava. On the other hand, by this same act there is created a partial vacuum in the chest, by means of which the blood is drawn toward the right auricle.

Rosapelly, who wrote in 1873 a remarkable thesis upon the conditions of the circulation in the portal vein, has demonstrated this action of the respiration. In fact, when one determines, in an animal, the pressure of the blood at its entrance and at its exit from the liver, it is observed that the pressure in the portal vein before its entrance into the liver, oscillates, in a dog, between 7 and 20 millimetres of mercury, while at its exit from the liver this pressure is only 3 or 4 millimetres, and is even ordinarily negative to the extent of 7 to 8 millimetres. The act of inspiration is one of the most important factors in the hepatic circulation; consequently any disturbance of the respiratory movement, and particularly anything which interferes with inspiration, disturbs and obstructs the hepatic circulation. We shall see what conclusions it is necessary to draw from this fact, when we study the pathogeny of hepatic congestions and their treatment. To this action of the respiration, and, in particular, of inspiration, upon the hepatic circulation, it is necessary to add contractions of the walls of the portal vein. The walls of the portal vein possess a muscular layer sufficiently thick to produce rhythmical beating of its trunk.

Rosapelly has also studied the rate of the circulation in the portal vessels, employing prussiate of potash and introducing 1 gram. of this substance into the blood of the portal vein. This substance is found in the blood of the hepatic veins, 8 seconds after its introduction. At the end of 25 to 30 seconds, the maximum quantity of the prussiate is found, and at the end of 1 minute, no trace of the salt is to be found in the hepatic veins. It should be understood that this experiment is made under conditions in which the influence of respiration is operative on the portal circulation. When the respiration of the animal experimented upon, is disturbed, there is great delay in the appearance of the prussiate of potash. Relying upon experiments made upon the dead liver, and employing the method of artificial circulation devised by Ludwig, Rosapelly arrived at the conclusion that the rapidity of the circulation in the portal vein is 33 millimetres per second. In the main trunks of the vein, this speed is only 22 millimetres per second. The velocity still further diminishes in the capillary network, where it is only 45 millimetres per second, while it is 16 millimetres in the hepatic veins.

Rosapelly has also studied the causes of obstruction of the circulation. He has shown, first, that when the pressure of the blood in the hepatic veins is equal to that of the portal vein, the circulation is arrested. As to the arterial circulation, it is arrested when the pressure of the hepatic veins is raised, although still remaining inferior to that of the portal vein. We learn, from this, the fact that the circulation is much more active in the portal vein than in the hepatic artery, and that any disturbance in the vena cava superior or in the right auricle, is sufficient to induce modifications in the arterial circulation of the liver, that is to say, in that portion of the cir-

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culatory system of the liver which is charged with the nutrition of the hepatic gland.

As to the quantity of blood which passes through the portal vein in 24 hours, it is considerable, since in a dog of 20 kilograms (44 pounds), Flogga has found a flow of blood of 500 grams (17 ounces) per minute, making nearly 720 kilograms of blood passing through the liver in 24 hours.

Further, Nonneret has shown that the liver can triple its volume and weight under the influence of vascular stasis. Finally, let us not forget that the nervous system has a considerable influence upon the hepatic circulation, and that this portion of the circulatory system may be profoundly modified by lesions of the cord, of the great sympathetic, and even by the pneumogastric.

I come now to speak of the modifications which the blood undergoes in its passage through the hepatic gland. Considered as a whole, the modifications which the liver effects in the blood which passes through it, relate to the water, the albumen, and the fats, as shown in the following table: —

	WATER PER 1000	ALBUMEN PER 1000	FAT PER 1000
Blood of the portal vein...	769.21	24.459	3.225
Blood of the hepatic vein..	686.46	16.703	1.686

There is a diminution in the percentage of water, in that of albumen, and also in that of fat. The hepatic cell, then, modifies the blood distributed to the surface of the intestine; and when we recollect that the intestinal vessels absorb, at the surface of the mucous membrane, water, peptones, and perhaps a certain quantity of fatty matters, it is easily understood that the liver plays an important role in removing thus from the blood, water, albuminoid substances, and fats, which have been introduced into it. But how is this modification effected? Have we here a true combustion? This question allows me to approach one of the most delicate points of this question of the liver as a blood gland; namely, the liver considered as an organ for the production of urea. Galen believed the liver to be a heat producing organ, a fact which we can understand when we recall the numerous chemical processes which take place within the hepatic parenchyma. When the temperature of the blood of the portal vein and that of the hepatic veins is determined, the temperature observed is represented by the following figures: —

Temperature of the blood of the portal vein, 40.2°C.

Temperature of the blood in the hepatic veins, 40.6°C.

The blood of the hepatic veins has a more elevated temperature than that of the portal vein, but this is a point of secondary importance, for it may be easily understood that the glycogenic function, and even the biliary secretion, may be a cause of this elevation of temperature.

Urea was discovered in the urine by Rouelle the younger, in 1772, and the experiments of Heynsius, Stokvis, Fürher, Ludwig, Meissner, and Cyon, showed by numerous proceedings that the liver contains urea, and that the blood, in passing through the gland, becomes charged with this substance. Fourcroix and Vauquelin, in 1808, affirmed that variations in the production of urea are connected with diseases of the liver.

Murchison, in 1874, united the various theories, and concluded that urea exists in considerable quantity in the liver, and that it is formed there. Finally, in a work which attracted great attention, Brouardel, in 1875, arrived at the conclusion that the quantity of urea secreted in 24 hours is dependent upon two principal causes: 1. The integrity or the disturbance of the hepatic cells; 2. The greater or less activity of the hepatic circulation.

However, this opinion is not admitted by all, and a great number of physiologists, adopt the opinions expressed by Dumas, who believed that urea results from the oxidation of albuminoid matters in the body in general, an opinion based upon the celebrated experiment of Bèchamp, who showed by oxidizing albuminoid matters with permanganate of potash, that urea may be obtained artificially, and it is admitted that a direct relation always exists between nutrition and the production of urea. Thus the opponents of the theory that the liver is the only source of urea, hold the opinion that the diminution in the secretion of urea in cases of hepatic disease is due to the fact that these disorders induce a disturbance of the general nutrition.

It should also be mentioned that Hoppe-Seyler, Hoppler, and Zalesky be-

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lieved that the kidney manufactures urea, considering the renal parenchyma as a true gland. However, in spite of these reservations, and especially if one considers the most recent experiments of Slosse, it appears demonstrated experimentally that when the hepatic cells are destroyed by a proceeding which consists in applying a ligature to the intestinal arteries, by which the death of the hepatic cells is induced, the secretion of urea disappears. It appears, then, to-day demonstrated that if the organic combustions may produce urea in all parts of the body, it is especially the liver which plays the most important role in the production of urea.

The attempt has even been made to carry the problem farther, and to ascertain from what elements the liver produces urea, and it has been thought that it is with ammonia and a nitrogenized radical that the liver produces urea. This view is based upon the experiments undertaken by Minkowski, Naunyn, and Stern, who have experimented upon animals by extirpation of the liver. They observed that ammonia appeared in the blood and in the excretions. However, this fact seems not yet to be absolutely demonstrated, and it also appears that the results differ according to the animal experimented upon. Neubelthau, by operating upon frogs, has arrived at nearly analogous results, finding ammonia in the urine of frogs from which he had removed the liver.

This is not the only function of the liver in relation to the blood. It now remains for me to speak of the hæmatopoietic functions of the liver. You know that the liver was considered by the ancients as a blood-making organ, and recent experiments seem to furnish ground for belief in Galen's hypothesis. However, the opinions which have been expressed upon this subject are absolutely contradictory, it being maintained, on the one hand, that the liver forms blood globules, and on the other, that it destroys these globules. Lehmann, who supported the first of these opinions, relying upon experiments made upon the dog and the horse, always found in the hepatic veins more blood globules than in the portal vein. The following figures given by Lehmann indicate the proportion of globules and plasma found in 1000 parts of blood: —

	Portal Vein.			Hepatic Veins.		
	I	II	III	I	II	III
Globules (horse)....	601	573	257	776	743	573
Plasma "	399	427	743	224	257	427
Globules (dog).. ...	460	447	450	695	650	748
Plasma "	540	553	550	305	350	252

This opinion has been combated by Schultz and Mandl, who have maintained that the liver destroys red globules, and that by the action of cholates. This destructive action, according to them, produces hæmapheine, and perhaps bilirubin. But, since methods for counting the blood globules have been perfected, it has been shown that the liver has little action upon the blood, and if any action exists, it is more destructive than productive of red globules. The following figures, given by Prof. Hayem, show the difference between the number of globules found in the blood of the portal vein and the hepatic veins: —

BLOOD OF THE PORTAL VEIN.

Red globules	7,773,000
Hæmatoblasts	238,000
White globules	6,350

BLOOD OF THE HEPATIC VEINS.

Red globules	7,700,000
Hæmatoblasts	228,000
White globules	7,900

According to this analysis, the blood of the portal vein is richer in red globules than that of the hepatic veins, but the difference is small.

In concluding these remarks respecting the role played by the liver in nutrition, I must say a few words respecting the action of the liver in the production of fat. Many physiologists have maintained the opinion that fat must have some other origin than that of the introduction of fatty matters in the food. In experiments made upon certain animals, and especially upon geese, Boussingault, after Liebig, had demonstrated that the quantity of fat accumulated in the bodies of these animals greatly exceeded that contained in the corn upon which they were exclusively fed.

Persoz studied the problem with greater exactness, and maintained that in the goose, in particular, the liver performs the function of transforming the starchy matters and sugar into fat. This opinion, which gave to the liver the exclusive role in the transformation of starchy and fatty matters into fat, is exaggerated. It is

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probable that the entire system participates in this transformation. In relation to the dietetic regimen of obese patients, I have shown that in such cases starch and sugar are transformed into fat.

(To be continued.)

Consumption of Meat from Tuberculous Cattle.— It is only necessary to read the medical journals and public press to see the great diversity of opinion that exists in the minds of the medical profession, scientists, and the public at large, concerning the danger that is incurred by the use of the flesh of animals suffering from tuberculosis. From the reports presented to the Congress of Tuberculosis in Paris, and from more recent investigations by Mr. Arloing, who has been experimenting in the inoculation of meat juice of tuberculous animals, the majority of physicians have arrived at the conclusion that the flesh of possibly one sixth of these animals is capable of causing phthisis. Various experimentalists, including Mr. Nocard, have by their work demonstrated the same fact. On the other hand, Mr. Perroncito (*Centralblatt fur Bakteriologie, XI, page 429*) has always defended the opinion that there was little danger in the use of such meat, and cited in argument the negative results of his own experiments. He has recently made new experiments on the subject, with meat from animals which had been isolated because they were suffering from tuberculosis with advanced lesions.

More than 200 rabbits and as many guinea-pigs were inoculated under the skin, or in the peritoneum, with meat juice from tuberculous subjects. None of these animals, killed after eleven months, presented any sign of tuberculosis. Two beeves inoculated under the skin with beef juice, remained immune. Four six-months pigs of Italian breed, nourished four months on tuberculous meat, presented at the autopsy no tubercles. Twelve others, two months old, nourished five months the same way, also escaped. Two young Yorkshires, nourished in the same fashion, failed of infection in three months. These animals were fed later on with intestines of beeves containing tubercles, all with impunity.

With these results of Mr. Perroncito before us, it should never be forgotten, however, that the other experimentalists mentioned above, equally as exact and equally learned, together with daily observations as mentioned above, have reached results just opposite, which do now and always will have their value. The question at this time is one which must be considered in the light of danger; for we must remember that if some experiments with vaccination give negative results, as many can be found which give positive results, and constitute as many indications of positive danger. Furthermore, it should not be argued for a moment that diseased meat should form a portion of our diet, even though it were non-infectious.

Glandular Tuberculosis.— Tubercular lymphangitis, it is now generally conceded, is due to the bacillus of tuberculosis. In fact, the vast majority of cases of adenites in the young or adult are of bacillary origin, and constitute local forms of tuberculosis.

Dr. Samuel Lloyd, of Randall's Long Island Hospital, reports between 200 and 300 cases in which lymphangitis seemed to have been produced by the germ of consumption. The points of entry of the microbes are, according to the author, injuries to the scalp, furuncles of the ear, face, etc., abscesses, decayed teeth, injuries to the mouth and nose, such as ulcerations of the gums, fauces, nostrils, etc. The bacillus of tuberculosis is almost always found, the number varying according to development of the disease and size of affected glands. The primary pulmonary lesions were not present in any of Dr. Lloyd's cases. The treatment that seems the most successful is complete, careful excision of all the affected glands. In one instance Dr. Lloyd removed eighty-five enlarged glands.

Eucalyptol by Inhalation in Pulmonary Phthisis.—Dr. Marche, a physician well known abroad by his good work in the treatment of tuberculosis, reports in *Medcine Moderne*, his method of inhalation of creasote and eucalyptol, which, in his hands, has given great satisfaction. Merck's *Bulletin*, October, 1892, gives this formula from the author: —

Eucalyptol	20 parts.
Creasote	8 parts.
Alcohol	72 parts.

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The whole is put into a saucepan and made to boil over an ordinary stove in the room in which the patient lives. This room should be spacious, but well closed, and the patient allowed to remain as long as possible.

Chloride of Zinc in Lupus.— Dr. J. Fedorow, of Russia, following the principles laid down by Lannelongue, of Paris, in the use of deep injections of chloride of zinc in the treatment of surgical tuberculosis, conceived the idea of using hypodermic injections of the same medicament, in the treatment of lupus. In two old cases the author claims the treatment was a success. He used a ten-per-cent solution of zinc into the circumference of the lupus ulcerations, says Merck's *Bulletin*, at the dose of a one-twentieth part of the contents of a Pravaz syringe, equivalent to one twelfth of a grain. The parts were bathed and the crusts detached by wet compresses, and anæsthesia was produced, first with a five-per-cent cocaine solution. The injections were made about twenty-eight days apart. In the first case, he used twenty-seven injections in four sittings in the space of twenty-eight days. In the second, he made thirty punctures at four sittings in the space of thirty-two days. The cure of these cases was complete, having taken place before the expiration of this time or shortly after.

Russian Treatment of Cholera.— Dr. K. Volovsky claims that he treats Asiatic cholera with success in the following manner: —

The patient is first placed in a bath as warm as can be borne, not below 99.5° F. At the same time, ice bags are placed about the head, and the patient is given small pieces of ice to eat. During this treatment, vomiting ceases, at least as long as the patient is in the bath, which should be about half an hour. This cessation of vomiting gives a chance to administer nineteen grains of calomel and a little castor oil, with wine or brandy. As soon as vertigo arises in the bath, the patient is taken out and dried carefully, and a mustard plaster applied to the abdomen, covering the whole of it, including the flanks. This mustard plaster should be kept in place by bandages or other means as long as possible. Fifteen or twenty minutes, it is stated, is as long as it can be borne by a patient that will recover, and its application is soon followed by a yellow stool. When the patient tolerates the mustard poultice for an hour or so, the case generally ends fatally. It is claimed by the author that some of the worst cases were cured in this way, and left the hospital in forty-eight hours.

A New Remedy for Paralysis Agitans. — Charcot, of the Salpêtriere, in Paris, has recently brought forward a new method of treating nervous affections which really looks like *similia similibus curantur*. He observed that some of his patients who were suffering from paralysis agitans were in the habit of taking long journeys on the railway, or drives over rough roads, in wagons, for the purpose of relieving the stiffness of the joints and other symptoms peculiar to the disease. He accordingly devised a shaking armchair, the use of which he claims is followed by very excellent results. After a few moments spent in the armchair, the trembling and severe stiffness of movements disappear, and patients fall into a quiet sleep. A vibrating helmet has also been invented, which is said to be useful in cases of insomnia. The writer has for more than a dozen years made use of vibration as a remedy in a variety of affections. The vibrating armchair which he constructed nearly ten years ago, has been in constant use since, and has exhibited very marked and specific therapeutic effects.

The vibrating helmet referred to, he has found especially useful in cases of insomnia. Several years ago, Mortimer Granville, of London, invented an instrument which he called a *nerve percuter*, which was applied especially to the head and spine. He claimed excellent results from its use, some of which we are able to confirm in the use of the instrument devised by Granville, and another instrument of somewhat greater efficiency, which we had constructed on a different principle.

The vibrating armchair devised by the writer, and referred to above, has connected with it a platform upon which a patient may stand while subjected to vibration at the rate of 2400 per minute. The effect of these vibrations is to throw the muscles of the legs into strong but not

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painful contractions. The particular groups of muscles thrown into contraction differ according to the direction of the vibratory movement in relation to the body. The peculiar physiological effect of this means of exciting muscular action, suggests the probability that the vibratory influence is a powerful stimulus of those portions of the nervous system which are affected in paralysis agitans, and it is through this means that the beneficial results are obtained. The writer has also made use of the mechanical vibration by means of vibratory bars, moving at the rate of 3000 oscillations a minute and in a variety of other ways.

Mechanical vibration, we are sure, possesses therapeutic means of great value; and when adopted by such great medical authorities as Charot, it will doubtless receive more attention from the medical profession than heretofore. J. H. K.

Abdominal Compression for Constipation.— A German physician, Dr. Feilchenfeld, of Berlin, has recently proposed a new method of combating constipation. It consists in applying to the abdomen a weighted compress, consisting of three or four pounds of shot, spread out between layers of wadding, and applied to the abdomen so as to give equable and continuous pressure over the entire anterior surface of the abdomen. The application is made with the patient lying upon the back. The length of the application may be one or two hours, morning and evening, or the entire night, the compress being held in place by tapes. The physician named above has employed this method of treatment during fifteen years, and claims to have realized excellent results. The theory of this operation is that the increase of abdominal tension by external pressure relieves congestion, and exercises an expulsive effect. Tympanites is especially benefited by this mode of treatment, and even cases of constipation without tympanites have been greatly relieved, and in some instances completely restored. The use of the weighted compress may be combined with the use of the cannon ball or shot bag, the ball or bag being rolled upon the abdomen outside the compress. These methods are of special value in cases in which the large intestine has been permanently dilated by long distention of gas or accumulated fecal matters.

BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

HOW TO OBTAIN RAPIDLY CULTURES OF BACILLUS TUBERCULOSIS.[1]

BY PAUL GIBIER, A. M., M. D.,
Director New York Pasteur Institute.

RECENTLY, new processes of easily obtaining pure cultures of bacillus tuberculosis have been published in Germany. One of them, by S. Kitasato, is given in the *Zeitschrift fur Hygiene und Infectionskrankheiten*, XI, p. 440. It consists in taking a portion of recently expectorated morning sputum, or of the contents of the pulmonary cavities, washing it ten times in sterilized water, and making cultures on glycerine agar, or serum. At the end of two weeks the tubercular colonies are isolated without difficulty.

E. Pastor (*Centralblat fur Bakteriologie*, XI, p. 233) uses a different process. After washing the sputum, he makes cultures on plates with glycerine agar. At the end of three or four days the common microbes mixed with the microbes of tuberculosis, begin to form their colonies, when by selecting the part on which no colonies appear, and sowing it with serum, he obtains the tubercular bacilli on from one to four cultures out of ten.

For over five years I have used the following method to obtain rapidly pure cultures of this bacillus: —

With the point of a lancet I inoculate the sides of a guinea-pig with the thick portion of the sputum. Eight or ten days after, the inguinal lymphatic glands begin to swell, and one of them is removed antiseptically, and introduced into a small-sized, sterilized glass tube, after being divided by three or four incisions. With a glass rod, roughened at one of its extremities, the gland is crushed, and mixed thoroughly with a small quantity of sterilized water. The fluid is aspired with a pipette, and sowed in balloons containing broth and glycerine, while the thicker part is spread on agar or serum, and all the cultures are placed in an incubator at 38° C. (100½° F.) In al-

[1] From a paper read before the Microscopical Society.

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most every vial a pure culture begins to develop in from ten to fifteen days.

It is easy to understand the rationale of this process. Generally after the inoculation of the guinea-pig, the incisions heal rapidly, and the comma bacilli are destroyed by the tissues or by the lymphatic elements (phagocytes, etc.), but the bacillus tuberculosis resists and develops in the glands, where it can be found in a state of pure culture.

HUMAN SALIVA AND PATHOGENIC MICRO-ORGANISMS OF THE MOUTH.

THE question of immunity has caused a number of experimentalists and investigators to make researches concerning the natural causes as well as the artificial means of rendering the organism refractory to infectious and contagious maladies. It was found at first that the blood of the organism had bactericide properties; later it was discovered that not only the blood had this remarkable quality, but many liquids of the organism, the muscular juice, for instance, milk, urine, etc.

M. Sanarelli (*Centralblatt für Bakteriologie*, X, page 817), following the same experiments, has investigated the action of human saliva on bacteria. The following is the conclusion of this work: —

1. The human saliva constitutes a medium very unfavorable for certain pathogenous micro-organisms.

2. It possesses the property of destroying them more or less rapidly when their number is not considerable.

3. Even when it allows development (as with the germs of pneumonia), it is capable of modifying their normal characteristics by weakening them and rendering them completely inactive.

The experiments of M. Sanarelli have been chiefly with respect to micro-organisms found usually in the mouth of sound or diseased individuals: the staphylococcus pyogenes aureus, streptococcus pyogenus, the bacillus of diphtheria, the micrococcus tetragenus, the diplococcus of pneumonia, the typhoid bacillus, and the cholera spirillum. The saliva was filtered with a Chamberland filter, and experiments were practiced by the plate method, as in the researches of the bactericide properties of blood. This fact explains, perhaps, the reason why the mucous membrane of the mouth is rarely affected with infectious maladies, in view of the fact that it receives so many dangerous infectious germs.

Milk as a Means of Producing Immunity.— Brieger, who has added so much to our knowledge of bacteria and their products, has discovered that immunity against inoculation with the microbe of tetanus may be produced in mice by feeding them upon the milk of a goat previously rendered immune against tetanus. They claim to have obtained positive results in typhoid fever by the same method.

The Germicidal Property of Light. — Buchmer and Minch have systematically investigated the influence of light upon bacteria floating in water. Among the microbes studied were the bacilli of typhus and cholera, and various destructive bacteria. In each case it was apparent that light possesses powerful germicidal properties. In water containing ten thousand germs to the cubic centimeter, so living microbes were found after exposure for a single hour to the direct rays of the sun. In another specimen of the name water kept in the dark at the same temperature, for the same length of time, the bacteria were found to be actually increased in number. It is the direct sunlight only that exercises powerful germicidal properties, but the diffused daylight was found to be sufficiently active to reduce the number of bacteria after a few hours' exposure.

The conclusion drawn by the authors is that the purification of natural waters is chiefly effected by the rays of the sun. A practical suggestion based upon the results of these investigations is that sewage should not be turned directly into rivers and other water courses, but should first be exposed for some time in large shallow basins lined with white cement, so as to give time for the destruction of microbes by the action of sunlight.

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IS THE AVERAGE CIVILIZED WOMAN DEFORMED?

THE writer has often astonished an audience by the assertion that the modern civilized woman is deformed, backing up the statement by a presentation of the evidence that the small waist of which the fashionable woman is proud to find herself the possessor, and which she so assiduously cultivates, is quite unnatural, and from a physiological standpoint, a serious deformity.

A deformity is any considerable deviation of the body from the natural form, whether it be a club foot, a twisted nose, a humpback, or a furrowed waist, and whether it be congenital or acquired. The existence of a flat or furrowed waist is so nearly universal among civilized women that even anatomists have come to consider this peculiarity of outline as a natural characteristic, and so put it down in the text-books for medical students. A careful study of this matter has, however, convinced us of the error of this provision. A flat or furrowed waist is the indication of prolapsed viscera, whether found in women or in men.

The natural contour of the abdomen is slightly convex. The curve is a continuous one from the upper end of the breast bone to the pubic bone, showing a slight flattening only at the "pit of the stomach," or epigastrium, a point located at the lower end of the sternum, or breast bone. The flattened or furrowed waist almost universal among women who have attained the age of twenty years and who are not abnormally obese, is directly the result of wearing tight clothing, and indicates as plainly as the most critical examination could do, that the abdominal organs which belong in the upper part of the abdomen have been thrust or dragged down by mechanical means. The stomach, liver, pancreas, kidneys, and spleen occupy that portion of the trunk which falls beneath the belt, as ordinarily worn. If the belt is drawn so tightly as to narrow the natural diameter of the trunk at this point, some or all of the various organs named must change their position, moving either upward or downward according to the direction in which the least resistance is offered. In order that this effect should be produced, it is not necessary that a woman should practice what is commonly known as tight lacing, that is, that extraordinary effort in which force is applied to constrict the waist. It is only necessary that the corset, waistbands, or belt should be applied so as to be what is sometimes termed "a skin fit" when the body is in a state of rest. A band or belt which restricts the body to its diameter when at rest, must be a sort of physical mischief causing serious injury.

In activity, the soft parts of the body always undergo a change in form. A muscle, when acting, swells as it shortens, thus increasing its diameter, and accordingly that of the limb to which it is attached. The reality and extent of this expansion during activity may be readily appreciated by grasping the upper part of one arm with the hand of the opposite arm, then forcibly bending and extending the elbow. The amount of increase in size required for the proper expansion of the muscle of the upper arm may be an inch. The waist is much larger than the arm. It is true that it is not a solid muscle, but this is also true of the arm, which contains bone as well as muscle, and it should also be noted in the case of

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the arm that a single set of muscles is brought into activity at one time. The bulk of the muscles located in the line of the waist, and which are constantly in action, is several times that of the active muscles of the upper arm. All muscles require increased room when they contract, and hence the muscles of the chest, by their action, tend to increase the size of the chest.

There are also two other causes of waist expansion, both of which are even more important in their influence and larger in their effects than the one mentioned. These are —

1. The action of the diaphragm, and —
2. The elevation of the ribs.

The diaphragm rises into the chest, forming a sort of dome-shaped roof for the abdominal cavity. The liver, stomach, spleen, and other organs occupy the upper part of the abdominal cavity, and are in close proximity with the diaphragm. In breathing, this muscle contracts, and in so doing necessarily forces downward all the organs occupying the upper part of the abdomen. As the abdominal cavity is thus shortened in length, it must necessarily increase in width, as its volume must remain precisely the same, since there is no natural means by which the natural volume of its contents can be appreciably diminished. This downward action of the diaphragm thus causes, in children, men, and natural women, a very marked swelling of the waist, acting especially to increase the diameter of the waist antero-posteriorly, or from before, backward.

The external muscles of respiration are chiefly attached to the chest walls on the sides, and act in such a manner as to separate the points of the ribs at the lower part of the chest; or in other words, the effect is to broaden the walls of the chest or to increase its diameter from side to side, whenever air is taken into the lungs in breathing.

The three causes mentioned result in an expansion of the waist in ordinary respiration from one half inch to one inch. When the activity of the lungs is increased by walking, running, singing or other exercises, the amount of waist expansion observed in healthy individuals in whom the normal breathing movements are unimpaired, is very greatly increased, varying according to the age of the individual and the degree of activity, from an inch and a half or two inches to three or four inches. Coughing, sighing, yawning, and other involuntary acts in which the breathing movements are especially increased, produce the same effect.

The conventional dress of the civilized woman in this enlightened 19th century, utterly ignores the physiological effects mentioned, which do not belong to the domain of occult or technical knowledge, but are familiar to every school girl. Any woman to whom the facts stated may be new, has but to make a few observations upon infants, young children, and even upon herself when the waist is wholly untrammeled by constricting bands or the dragging of heavy skirts.

It must be apparent, then, that "*tight lacing*" is not necessary to produce a flat or furrowed waist and all the evil consequences which are associated with the deformity. It is only essential for the production of these evil results that the clothes should be so adjusted as to prevent the natural expansion above described. A band which is only skin tight or not really tight at all, but an easy fit at the waist when the body is at rest and the breathing movements are comparatively slight or perhaps even suspended, as is probably the case most commonly when the waist measure is taken, becomes really a decided constriction as soon as the breathing movements are increased by bodily activity of any sort.

The unnatural desire for a smallness of waist which is neither healthful nor beautiful, although prescribed by the fashion plates and the "modes" of the dress-

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makers, has caused civilized women to subject their bodies to maltreatment of the most injurious character. The complacency with which women bind constricting belts about their waists, and hang thereon a heavy load of dragging skirts, the constant strain and pulling of which must inevitably result in the displacement of some of the most important organs of the body, is thoroughly astonishing. Nothing but the densest ignorance or the most unaccountable obtuseness to the natural requirements for the well being of the body, can explain such gross and such universal disregard of the plainest physiological laws. All this abuse of the body seems to be the result of a perverted notion that the female figure is not properly constructed, and needs reconstructing. The mischief which women have done themselves by this neglect and abuse, is clearly shown in the general decline in woman which has won for her the title of the "weaker sex," and it has given rise to a multitude of maladies peculiar to women, which are most destructive to the individual woman, and which impair the vitality of the race and even threaten its decline and possible extinction, as evidenced by the rapid depopulation going on in France at the present time.

Women are beginning to awaken to the fact that a large part of the "side-aches," "back-aches," aching nerves, and neuralgias, headaches, and prostrations, are nature's warnings against the violation of natural laws; and they are beginning to heed these natural voices, which have hitherto been to them an unknown tongue. But the great multitude are still in ignorance, and abjectly worship the remorseless Moloch which has accomplished more in weakening the stamina of the race and destroying human lives within the last century than have either war or pestilence.

Every woman ought to be a self-appointed missionary, preaching the gospel of emancipation from the fetters of conventionalism, and teaching the better way in dress, which means for both women and men a higher and better life, and deliverance from a "sea of troubles" which has so long beset them. And every physician ought to be an apostle of the doctrine of sensible and rational dress reform. J. H. K.

ABDOMINAL SECTION FOR DROPSY.

Most practitioners who have had a considerable number of years' experience must have met with cases of dropsy in which there was no distinct evidence of disease of either heart, kidneys, or liver, and which were not relieved by repeated tappings, the patient finally dying from exhaustion. The absence of evidence of the presence of an ovarian cystoma placed at rest any thought respecting the advisability of resorting to surgical interference.

Recent observations show that in a great majority of these cases, a physiological condition exists which is not infrequently amenable to surgical treatment. Dr. Bantock, the eminent ovariotomist connected with the Samaritan Hospital, London, recently reported a case of this sort, in which, on opening the abdomen, a papillomatous mass was found connected with the uterine appendages on either side. The vagina was removed, the abdomen washed out, enclosed, and the patient made an excellent recovery. At the time of the operation, she was so greatly emaciated, and in so weak a condition, that death in a short time seemed imminent.

Dr. Barnes reported two cases of the same sort, in one of which the patient was in good health two years after the operation. He took strong grounds against abdominal tapping, insisting that it hastens rather than retards a fatal issue, while abdominal section gives "sensible, if not complete relief."

Other members of the British Gyneco-

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logical Society, before whom the case is reported, agreed with Dr. Bantock and Dr. Barnes, that abdominal section is the proper method of treating cases of dropsy in which there is "no obvious disease of the heart, kidneys, or liver."

There are, evidently, two classes of papillomatous disease met with in the abdominal region, — one malignant, the other non-malignant. The writer has met four cases of this disease, all of which, however, proved to be malignant, or at any rate the disease recurred. In the one case, complete removal of the diseased structures was possible. In this case, the patient, who was very large, had been tapped many times, and was greatly weakened as the result of the long continuance of the disease and the repeated tappings. The pelvis was found filled with a papillomatous growth closely resembling cauliflower. There seemed to be at first but one mass, but on further investigation, it was discovered that there were two masses closely matted together; each of these had its origin from a small pedicle starting out from the Fallopian tube on either side. Both appendages were removed, including the papillomatous masses. The patient made an excellent recovery, and the dropsy did not recur for several months. The patient left the Hospital apparently in good health. Six months later, however, it was reported that the dropsy had returned, probably as the result of the recurrence of the growth. I have neither seen the patient nor heard of her since, and therefore do not know the ultimate result.

Other growths connected with the uterus and ovaries sometimes give rise to dropsy. A small amount of ascitic fluid is very frequently present in both ovarian tumors and in uterine fibroid growths. Some years ago, the writer made an abdominal section in a case of dropsy, the cause of which was obscure, the patient being apparently free from disease of the heart, liver, and kidneys, but had not been relieved by any remedy which had been tried. The fluid accumulated so rapidly that tapping became necessary once in about ten days or two weeks at farthest, and more than 240 pounds of fluid had been withdrawn within the space of three months. The patient was very large when she came under the writer's care in the Sanitarium Hospital. Although she had been tapped only a week previous, on opening the abdomen, forty pounds of fluid were withdrawn, and a kidney-shaped fibroid tumor was found attached to the top of the uterus. The tumor was exactly symmetrical, being attached by the middle portion, and about three times as large as a young infant's head at birth. It was a very loose structure, and it appeared that the dropsy was the result of a straining out into the peritoneal cavity of the serum of the blood through the loose structure of the growth. The tumor was removed, and the patient made an excellent recovery, and has been in good health for more than two years. No sign of dropsy appeared after the operation.

In another case which entered the Sanitarium Hospital a few months later, there was a similar history. There was found, on opening the abdomen, a tumor on each ovary. Both growths were evidently of rapid development, and were made up of a loosely formed structure. This patient also made a good recovery from the operation, although she died suddenly in a state of coma, a few weeks after leaving the Hospital. Just what was the pathological condition which was the immediate cause of death, was not determined. It may have been either uræmic poison or epileptic seizure.

Another case, which recently came under our observation, very forcibly illustrates the importance of an exploratory operation in cases of dropsy suddenly occurring. The patient was a maiden lady 46 years of age, and was operated on August 29. Three weeks before, she had

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observed that she was losing flesh and had a slight fever, and a few days later noticed an increasing fullness of the abdomen, which steadily increased until, at the time of the operation, there was very marked evidence of ascites with considerable distention. No evidence of hepatic disturbance existed, and no just cause could be found for the dropsy. The writer's experience with similar cases led him to decide to operate at once instead of temporizing with tapping.

On opening the abdomen, a quantity of fluid gushed out, presenting the usual appearance of ascitic fluid. The whole quantity of fluid removed weighed 19¼ pounds. As soon as the finger was introduced, it was noticed that the peritoneum was everywhere covered with minute tubercles scarcely larger than the head of a pin. The intestines were also covered with similar tubercles, and the omentum fat was gathered into small nummular masses pointed at their free extremities, resembling large cranberries in size, but somewhat elongated.

In the left side an ovarian cyst the size of a large orange was found and removed. The abdominal cavity was washed out, my aseptic drainage tube introduced, and the wound closed. The first day nearly a quart of fluid was withdrawn. The next day one pint. Since that time the amount of fluid has not exceeded two ounces in twenty-four hours.

The above cases clearly demonstrate the importance of an exploratory incision in all cases of abdominal dropsy occurring suddenly, and in other cases in which the ascites cannot be attributed to a sufficient cause.

Since writing the above, the writer has encountered another case similar to the one last mentioned. A large cyst was removed on one side, but the diseased structures involved so many important structures on the left side, removal was impossible. The dropsy speedily returned. J. H. K.

PRECAUTIONS AGAINST CHOLERA.

THE *British Medical Journal* gives the following account of the rules that were enforced at the London Hospital during the prevalence of the cholera there, and for the protection of the nurses engaged in caring for the patients: —

"The first two or three days, Condy's fluid, diluted, and chloride of lime; subsequently, carbolic disinfecting powder and carbolic acid, largely diluted (1 to 40), mixed with sawdust in quantities sufficient to wet the sawdust and sprinkle about the passages, wards, closets, etc. None of the excreta from patients was allowed to be emptied into the sewers; instead of this, a portion of dilute carbolic-acid fluid (about half a pint), was put into each chamber pail, and buried in the garden. The pails had water-tight lids. Burnett's fluid was sprinkled in the cabs that brought the patients. The straw from the beds was burned in each case of death, or where much soiled by excreta. The linen from the cholera wards was washed separately in the laundry of the hospital with Mc Dougall's disinfecting soap. Hot coffee, beef tea, etc., were recommended to be taken by the nurses at early dawn, and every one was advised to avoid going on duty with an empty stomach or in a depressed condition. An extra allowance of wine and pay was made to the nurses."

We have not quoted the above rules for the purpose of commending them, but for the purpose of expressing our surprise that so scientific an authority as the *British Medical Journal* should, at this day, in the face of modern scientific discovery, give place in its columns to such remarkably absurd and utterly useless, we may even say dangerous, instruction. Carbolic acid, chloride of lime, and similar substances, "sprinkled about the passages, wards, closets, etc.," would give rise to what might be termed a sanitary smell, but no substantial benefit in the

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way of destroying germs could possibly arise from such a mode of disinfection. Whether it were wiser to bury the cholera germs in the garden after mixing with them a small portion of "dilute carbolic acid fluid," instead of allowing it to run down the sewers, is quite a question. The amount of carbolic acid coming in contact with the germs under these circumstances, might possibly stimulate them to a high degree of activity, but could not possibly have any influence in rendering them innocuous. But the most astonishing statement is, that "the straw from the beds was burned in each case of death, *or where much soiled by excreta.*"

We are astonished, first, at the statement that straw beds are in use in a London hospital, even among cholera patients, when so many satisfactory devices for antiseptic beds have been proposed; and second, that hospital authorities should consider it necessary that "straw beds *should be* MUCH *soiled by excreta*" before being condemned to cremation. It was certainly a wise precaution that the linen was "washed separately in the laundry, with McDougall's disinfecting soap." What about the chances for infection in moving clothing to and fro, in and about the laundry? of infection of the outer surfaces of the laundry also, to say nothing of the danger to persons employed in the much handling of infected clothing? The case reminds us of a rhyme culled from a newspaper many years ago: —

> "The river Rhine, as is well known,
> Washes the city of Cologne.
> But, O ye gods and powers divine!
> Who then shall wash the river Rhine?"

A patient recovering from an attack of Asiatic cholera in an American hospital would doubtless be compelled to look up the smoke-stack of the furnace for his wardrobe, and if he ever discovered his coat, shirt, and pantaloons, if discoverable anywhere, would be found floating off on a cloud-bank, exposed to the disinfecting influences of the sunlight. The physicians in charge of the South American Hospital, during the severe outbreak which prevailed in Chile, five or six years ago, employed the following measures, which we are glad to be able to present in contrast with the above absurd and mediæval methods: —

"For washing the hands and face, a solution of corrosive sublimate (mercuric chloride, 1 to 1000) was exclusively used. In the dining-room all dishes before being used were strongly heated by the flame of burning alcohol. The bread was sterilized by toasting. It is stated that no one of the staff sickened, who adhered rigidly to these precautions. The convalescents before their discharge were bathed in the corrosive sublimate solution, and their clothing was washed in a similar disinfecting solution. The floors of the hospitals were made of a kind of pine parquet soaked in tar, and were washed daily with a solution of either copper sulphate or potassic permanganate, 1 to 1000. On emptying a ward, it was fumigated according to rule by sulphurous acid gas for twenty-four hours." J. H. K.

REVIEWS.

A Review of Forty-eight Cases of Abdominal Surgery. — By Clinton Cushing, M. D., San Francisco, Cal. The author reports only five deaths, a little less than eleven per cent mortality, giving evidence of careful surgical work. The paper is accompanied by a carefully prepared tabulated presentation of important facts relating to each case, which adds greatly to the value of the report.

A Review of Twenty-five Consecutive Cases of Abdominal Section. — By Reuben Peterson, M. D., Grand Rapids, Michigan. This paper by a comparatively young operator commends itself to the reader, not only by the good results obtained, but by the good sense shown in the observations made. The

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author is destined to make a mark as an abdominal surgeon.

The Actions of Drugs which are Believed to Conserve the Tissues: Alcohol, Tea, Coffee, Coca, Mate, Kola, Guarana, Hemp, Tobacco, Opium, Etc.— By Edward T. Reichert, M. D., Philadelphia. The great number of valuable scientific papers contributed by this author to the fund of scientific knowledge, particularly in those branches of physiology which have a bearing upon the cure and prevention of disease, indicates a very unusual amount of industry combined with a true scientific spirit and unusual qualifications for experimental inquiry. The author sums up the results of interesting experiments in this paper with the remark that "cocaine or caffeine acts as a forced draft, supplying no energy in themselves, simply causing the fire to rage more fiercely." The author's work, the results of which are recorded in this sentence, completely upset the old theory that by the use of the drugs mentioned in the form of tea, coffee, or cocoa-leaves, as well as the use of tobacco and similar drugs, conserves the tissue while increasing the energy of the body.

Dr. Reichert has done the medical profession much service in dissolving the absurd paradox to which scientific men have so long been permitted in their attempts to apologize for the common use of these poisons.

The Uses of Fever Heat; The Occasional Dangers of Antipyretics in Typhoid Fever.— By J. H. Musser, M. D., Philadelphia. Dr. Musser is doing the profession a favor, and the public a still greater favor, in the contribution of such a paper as this. In one case which he records, five grains of antipyrene producing so serious a colapse that the services of three persons were required for several hours to restore the patient to a natural temperature and save her life. Dr. Musser says respecting the use of the antipyretic method in typhoid fever, "I have never used such means to reduce temperature in this disease, but I wish to impress particularly upon those who will use antifebrile drugs, that it is essential that they should hold their hands at least at times. The present intemperance in the use of antipyretics is due to laudation of this class of drugs by eminent therapeutists in days gone by." Our experience accords exactly with that of the writer of this paper, whose views we commend to the profession.

The Address in Medicine.— By J. H. Musser, M. D., Philadelphia. We quite agree with the statements made by this author that "the powers of therapeutics are not in drug stores; that the 'imponderables' of old — that heat and cold, electricity, baths and bathing, exercise, fresh air, proper diet, proper clothing, and hygienic surroundings, suitable climate, regulated work, and methods to remove causes — are the true powers with which to combat disease." The author further says, "I cry out against myself when I must give drugs. Too often it is like the ostrich with his head in the sand," to which we heartily say, Amen.

Habitual Abortion.— By E. S. McKee, M. D., Cincinnati, Ohio. A brief paper in which chlorate of potash is recommended as a most proficient means of preventing habitual abortion. This drug is believed to be of special value where habitual abortion is due to fatty degeneration of the placenta. A bibliography is appended.

Report of an Operation for Removal of the Gasserian Ganglion.— By Emory Lanphear, M. D., Ph. D., Kansas City, Mo. A brief paper detailing a very interesting case, requiring an unusually difficult operation, which was evidently skillfully performed and with good results.

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The Bacillus of Typhoid fever in the highest state of development (with moving filaments or flagella). From a photograph by Riffarth, Berlin.

Vibrion (Spirillum) of Cholera. The corkscrew-like thread traversing the center of the field shows the microbe in the highest form of its development.
Magnified 1000 x.
After Fraenkel and Pfeiffer.

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MODERN MEDICINE

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BACTERIOLOGICAL WORLD.

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ORIGINAL ARTICLES.

TYPHOID FEVER IN THE LIGHT OF MODERN RESEARCH.

BY L. BREMER, M. D.,
St. Louis, Mo.

Influence of Light on the Microbe.— The sunlight especially, and the diffuse light in a less degree, are not only detrimental to its toxic properties, by enfeebling its growth, but they kill it in a short time. If, for instance, a number of test-tubes containing bouillon, sown with typhoid germs, be exposed to the more or less direct rays of the sun, or kept in the shade, it will be found that the test-tube most directly exposed does not contain any living specific bacteria after an exposure of from 3 to 6 hours. It is not the heat, but, as has been proven, the chemical rays, that destroy the life of the bacteria. The diffuse daylight, too, is inimical to its life and toxicity. Hence it may be said that the typhoid bacillus shuns light and thrives in darkness, a powerful proof of the correctness of current notions as to the beneficial effects of sunlight and air, as enemies of disease.

Ectogenous Existence of the Bacillus.— Of the typhoid bacillus, as it occurs in nature, we have only a rudimentary knowledge. That it does exist in a saprophytic state, there can be very little doubt. Its faculty of thriving in ordinary temperatures and its unpretentious and, figuratively speaking, when compared with the cholera vibrion, its "sociability" with the ordinary saprophytes, enable it to accommodate itself to more or less adverse conditions. But where is its habitat, in the water, or in the ground, where it leads a saprophytic existence with lessened or entirely suspended virulence? Is it a permanent resident in certain houses which are known as typhoid fever houses? and does the outbreak of typhoid fever epidemics mean that the bacillus, favored by certain conditions, which we are at present unfamiliar with, has re-acquired its suspended or lost virulent character, and is now ready to do its deadly work?

The answer to these questions cannot be definite as yet, but we can approximate the actual state of things by consulting the testimony as to the power of resistance under given conditions of the bacillus, as taught by the laboratory experiment and as epidemiological experience has recorded it.

Now, it is a peculiar fact that in spite of its easy destructibility by the sun's rays, its vitality is astonishingly great under other seemingly most adverse and even fatal conditions. Thus it has been found that it will survive in ice for many months,— an important lesson as regards the harmful practice of drinking ice water.[1]

Vitality of the Germ.— Alternate thawing and freezing, however, will kill it.

The results of experiments, as to the power of endurance in water, are rather conflicting. While one investigator (Karlinsky), who experimented on a large scale with cisterns out of actual use, found

[1] Here is a field of special interest to the boards of health of the larger and smaller cities of the country. There is a meat inspector and a milk inspector, but nobody cares where the ice comes from, provided it is stated by the dealer that he sells only "pure lake ice." Whoever has seen with what utter disregard to the simplest hygienic precautions the ice crop is gathered, must be astonished, if he be familiar with the fundamental teachings of bacteriology, that epidemic diseases are not of more frequent occurrence. I am sure that to the tumbler and the ice box are traceable many a case of typhoid and diphtheria. The ice box especially offers the greatest opportunities for food contamination. But even with impure ice at our hands, the danger of infection may be greatly lessened by boiling the water, allowing it to cool, and keeping it in corked bottles *on* the ice. This diminishes, to say the least, the chances of introducing into the stomach pathogenic germs in heavy doses.

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that ordinary water, contaminated with typhoid dejections, is devoid of bacilli in about two days. Others have demonstrated that the germ can be kept alive in even impure water, for days and weeks.

Thus, it has been shown by laboratory experiment, to live and thrive in Panke water (the Panke is a small creek which flows through Berlin and is about as notorious as Mill Creek or River des Peres are with us). Stagnant water offers more favorable conditions than flowing water; but even in the latter it will accommodate itself to adverse conditions.[1]

The Bacillus Found in Drinking Water. — Thus the bacillus has been found in the Seine water; during an epidemic in Iron Mountain, Michigan, Vaughn and Novy demonstrated its presence in the drinking water. In some other epidemics the search has been reported as successful. I myself had an opportunity of examining the water in two wells reputed to be infected, but the results of my examinations were negative. In both instances the specimens had been sent by express, thus offering an additional difficulty to the ordinarily existing ones, of arriving at a definite conclusion.[2]

Epidemiological Proof. — The most conclusive proof, however, that river water may be the carrier and harborer of typhoid germs, is furnished by the epidemiological histories of cities like Paris, Vienna, and Berlin. In Paris it has been shown on different occasions that the fever prevailed in an epidemic form, only in those parts of the city which were provided with Seine water through the public works, while other parts, deriving their supply from other sources, were free. Vienna was a notoriously typhoid fever city until the Danube water was replaced in the water works by a purer article from the mountains. Berlin had a similar experience to that of Paris. Now, the presence of typhoid germs was demonstrated in the hydrant water of neither Vienna nor Berlin; but the ceasing of the epidemics after changing the source of supply, proved that the former supply was infected. In fact, water seems to be the chief disease carrier in epidemics of typhoid fever, while sporadic cases must be attributed to other channels of infection.

Durability of the Bacillus in the Dried State. — In feces and urine the typhoid bacillus has been found alive and pathogenic after months, — a proof, to my mind, that the role of the grave-yard as a disseminator of the fever cannot be dismissed abruptly, as has been done by several writers.

Its greatest durability is exhibited by the bacillus in the dried state. A silk thread drawn through a pure culture, and dried, will be found to contain virulent bacilli after twelve months.[1]

Dried feces are particularly tenacious as to virulence, and dangerous as to infection. Experiences in Russian and German barracks have demonstrated it to a certainty. Most instructive is the history of a Hanoverian regiment, of which no less than 45 per cent were attacked with typhoid fever during the years 1875 to 1884. Shortly after the discovery of the true cause of the disease, the specific microbe was looked for in the barracks, and found in dried feces on some uniforms, which, according to the system of military service, had in turn been used by succeeding drafts of soldiers. The cleaning and thorough steaming of those uniforms stamped out that barrack epidemic, which was certainly one of the most conclusive proofs of a bacteriological truth and one of the grandest triumphs of bacteriological research. Similar results, not less striking, were observed in Russia.

Portals of Entrance in the Body. — There is at the present day little doubt that the chief, if not the exclusive, portal of entrance of the typhoid germ is the

[1] I have been informed by a gentleman who passed through the late civil war, that a common method of purifying suspected water in the South, was to have it whipped with twigs for hours. At that time Liebig's ideas of oxygenation were still dominant. In the present light of bacteriological science, the purification, which no doubt did result from the process of whipping, was due to the exposure of the bacteria to light, which renders almost all of them harmless, and of keeping them in motion, which prevents their multiplication and colonization.

[2] It is impossible to estimate the number of bacteria necessary for a successful infection, and almost impossible to ascertain even approximately the number of pathogenic bacteria in drinking water. The ordinary manner of taking one or two drops or even ten or fifteen drops will commonly fail when the extreme state of dilution of the virus is considered, in which it must of needs occur in rivers. There may be one bacterium to a drop in a fluid to be examined, but there may also be one only to a litre, and the difficulty and unreliability especially as regards the presence or absence of the typhoid bacillus, becomes at once apparent. Recently a centrifugal machine has been invented by Dr. Litten, of Berlin, with which small particles of matter suspended in fluids, casts, urine, blood, and pus corpuscles, bacteria, etc., can be precipitated in a short time to the bottom of a test-tube. This instrument may be advantageously used in the examination of water for microbes. An electric fan motor answers the purpose very well. By a trifling mechanical contrivance, the Emerson motor, whose speed can be regulated, is easily converted into a perfectly working centrifugal apparatus.

[1] Silk thread seems to possess a peculiar preserving power. Even the cholera vibrion, commonly so perishable in a dry state, can be preserved with its pathogenic properties for many months on silk thread.

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intestinal tract. The lungs, formerly suspected under the dominion of the miasmatic theory, do not enter into consideration any more, as organs through which the poison gains access to the organism, except, perhaps, in so far as noxious gases may, when inhaled, make an individual more susceptible of the infection. In other words, typhoid fever is not inhaled, but it is eaten and drank, like cholera.

Soils Favoring Growth Outside of the Human Body.— Like the cholera vibrion, the bacillus of typhoid fever thrives on all alimentary substances used by man. It grows on vegetables and meat. Milk, though spoiled, is a good growing medium, and no doubt has carried typhoid fever into many a family. Butter[1] will preserve the bacillus for weeks. Seltzer water, and probably a number of other artificial mineral waters, offer it a place of refuge.

Circumstances Facilitating Invasion.— Of course, as in all diseases, there are collateral causes favoring the development of the germ by preparing the soil, *i. e.*, weakening the human body. Such collateral causes are depressing conditions, but above all the physiological misery are the underfeeding and crowding together of people, neglect of simple hygienic laws, debauches, exposure, etc.

Incubation.— Supposing that the contagionist view (in a wider sense) is correct, and that typhoid fever cannot arise in persons who have not in some way introduced the specific bacterium into their intestines, the question presents itself, How long a time is requisite for the parasite to multiply and colonize, before the clinical symptoms make their appearance? The general impression, founded upon the records of cases imported into previously infected communities, has been that the interval between the presumed infection and the demonstrable beginning of clinical symptoms, is about three or four weeks. Almost conclusive on this point is an observation made by Dr. Almquist, a Swedish physician and a recognized authority in the epidemiology of typhoid fever: A servant girl returned from service to her village, sick with typhoid. No case of this disease had existed in the village previous to her arrival. In from three to four weeks the whole of her family were taken with the fever.

Mixed Infections.— The typhoid virus gives rises to a multiplicity of lesions. No organ or tissue is safe from its deleterious action. The coarse changes, however, witnessed in the course of the disease, and after it, are generally due to a fresh infection with other micro-organisms. Chief among these are the pus producers. When the typhoid bacillus is doing its deleterious work, these microbes have a better chance of invading the body of the patient. The ulcers, notably those of the larynx, and the abscesses which are not unfrequently met with, are the result of these secondary invasions, principally that of the staphylococcus pyogenes, occasionally though, the bacillus of typhoid fever has been found to possess pyogenetic properties.

This raises the question, whether other lesions complicating the disease may be the work of the typhoid microbe exclusively, or whether additional invaders are requisite to produce complicating disorders.

The pneumonias complicating typhoid, which I had an opportunity to examine microscopically (a few by culture) showed pneumococcus in a few instances and a streptococcus infection in others. In some I found the typhoid bacillus, in others in conjunction with Weichselbaum-Fraenkel's diplococcus. What is termed typho-pneumonia is etiologically speaking a diplococcus affection, and has nothing in common with typhoid fever. Pneumonia occurring with typhoid is, as a rule, a mixed infection.[1] The same is true of erysipelas developing during the disease. Here the streptococcus can generally be demonstrated.[2]

[1] Of late, "infected" butter has repeatedly received the attention of hygienists.

[1] Hypostatic pneumonia is to be strictly separated from the infectious forms. Its origin is a mechanical one, its primary cause being an insufficiency of propelling power on the part of the heart.

[2] Erysipelas, though, as ordinarily understood, a pathological entity, the etiological factor (streptococcus) being always the same, was by some thought to be merely a manifestation of the activity of the typhoid bacillus, when appearing in the course of typhoid fever. It was logically inferred that a germ which was capable of producing inflammatory processes in the intestines, might under certain conditions localize in the skin, giving rise to a dermatitis which, clinically considered, it would be impossible to distinguish from typical erysipelas. Hence the typhoid bacillus was looked for in such cases, but excepting in one or two observations, was not found, a streptococcus being generally met with. That, however, an osteitis, periosteitis, and abscesses in parts distant from the topical intestinal lesions, may be due to the typhoid bacillus, has been repeatedly demonstrated. But more frequently the staphylococcus and streptococcus have been encountered in such instances as secondary invaders.

(To be continued.)

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THE MICROSCOPE AS A FACTOR IN THE DIAGNOSIS, PROGNOSIS, AND TREATMENT OF MORBID NEW GROWTHS.

WILLIAM C. KRAUSS, M.D., F. R. M. S., BUFFALO, N. Y.,
President Buffalo Microscopical Club.

THE diagnosis of cancer *after* it has once made a permanent home in the human body, is no longer excusable. Time was, and not so far remote, when the clinician was obliged to wait for conclusive evidence before resorting to operative procedure, and in that time the growth had infiltrated neighboring tissues to such a degree that the life of the patient was imperiled. This condition of things has changed materially within the past few years. The pathologist, armed with a modern microscope and himself trained in the modern methods of investigation, can give the surgeon almost positive knowledge concerning the malignancy or benignancy of the growth in question. The examination need not be delayed until the patient is under the anæsthetic, but by means of a trocar (*emporte-pièce histologique of Duchenne*) small sections of the tumor may be removed and examined during the early growth, and its character determined. Should its location be upon dangerous ground, such as in organs or tissues where there is constant irritation, or where there is at times increased physiological action, or where there is conjunction of tissues derived from the epiblast and mesoblast, then repeated examinations are necessary to detect any degenerative change which may alter the character and consequent diagnosis of the neoplasm. In fact, so important is this that not only will a single examination be insufficient and inadequate, but several such microscopic examinations should be made by two or more equally skilled pathologists. Consensus of opinion should be arrived at as early as possible, and communicated to the surgeon in such terms that his duty will be forcibly impressed upon him. A single examination by a single observer means little or nothing, when from the clinical standpoint there is the least shadow of a doubt as to its nature.

The pathologist who is called upon to judge whether a small piece of tissue is normal or abnormal, and, if abnormal, whether it be benign or malignant, must have, in the first place, a thorough knowledge of the anatomical and histological elements of the various tissues of the body. Furthermore, he should be acquainted with the various steps in the development of such tissues, their transformations and processes of growth during the embryonic stage, and the functions which they are to assume at the close of fœtal life. The onward tread of science within the past few years has made it necessary for the pathologist to study more the causation of disease and diseased processes, and to trace, if possible, the origin to a specific germ or bacterium. As yet, bacteriologists have not definitely taught us of this causative relation, although some observers have made cultures from and discovered bacteria in the tissues of tumors.

These allied sciences, stepping-stones to pathology, must be fully mastered if the investigator expects to attain anything like accurate results. Especially in histology is much experience and personal application essential. No one can hope to pass judgment upon a diseased tissue if the picture and nature of the healthy normal tissue be not continually before his eye and mind. The only way to secure this indispensable knowledge is by careful, painstaking work with the microscope in a well-equipped histological laboratory.

Having this fundamental knowledge and training, the investigator must follow some classification, and none is more perfect and universally accepted than Virchow's, based upon the germinal layers from which the original tissue giving rise to the neoplastic growth was derived.

It is often by exclusion that a diagnosis must be made, and to follow out this process one must be acquainted with the different forms and varieties, divisions, and subdivisions. With the satisfaction of being able to place every tumor under its proper head, it is not a very difficult task to compare the cells of the mesoblastic or connective tissue growths with their normal prototypes, and to classify them accordingly.

Characteristics of Tumors. — We know by observation that tumors tend to reproduce their like, and that this tendency is inherited sometimes through several generations. As a rule, the same characteristic cell is reproduced, and thus the knowledge gained from the father may be applicable to the son.

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Tumors follow, in the majority of cases, the type of tissue from which they spring, or, in other words, are homoplastic. A neoplasm growing from muscle, or nerve, or cartilage, is generally composed of that particular form of tissue as the case may be. Sometimes, however, the tumor tissue changes to that of a higher type, as a fibroma to a chondroma, but never a fibrous tissue to an epithelial. This last characteristic is, according to an important law, known as the specific nature of tissues, founded upon the fact that a tissue derived from one germinal layer cannot change to a tissue developed from a different germinal layer. Hence a tumor of the mesoblastic or connective tissue group is not liable to become a tumor of the epiblastic group.

The location of tumors is an important aid to the pathologist; for, as we have just seen, tumors tend to grow from tissues typical to their own. Malignant tumors, on the other hand, grow where tissues derived from the different germinal layers meet, as about the lips, larynx, rectum, etc., where there is constant irritation, and in those organs with increased physiological function, as in the mammary glands, uterus, etc.

Being cognizant of these facts, the pathologist is prepared to listen to the clinical history, and to make an examination of the growth *in situ*, or, if it has been enucleated, to examine it in the laboratory. The clinical history should never be underestimated or neglected; the daily condition of the patient as noted by the surgeon or family physician may give valuable information regarding the character and growth of the tumor, especially if it be a malignant one.

A tumor growing on dangerous ground in a subject past middle life, accompanied with constitutional disturbances, is, in the majority of cases, apt to be carcinomatous, and calls for speedy action. On the other hand, a circumscribed, non-adherent, globular mass appearing under the skin or scalp, may grow for years without the least danger or perhaps inconvenience.

The appearance of the neoplasm *in situ* gives many diagnostic points. To see the form, color, appearance of the central mass, edges, etc., in many cases alone solves the problem. The appearance of the myxoma, cholesteatoma, melanoma, and others is characteristic if not pathognomonic; and although it is not judicial to make a snap diagnosis and forego further examination, nevertheless in many cases the character of the tumor can be thus predetermined.

To the touch, the mass appears hard or soft, adherent or non-adherent, even or uneven, lobulated, sessile, or pediculated, as the case may be.

The condition of the neighboring organs, tissues, and glands should not be forgotten. Infiltration of the adjacent tissue and chain of lymphatics is quite characteristic of the carcinomata. In cases of suspected malignant disease of the internal organs, the diagnosis is greatly strengthened by finding the lymphatic glands of the groin enlarged and hardened. The carcinomata and sarcomata are the only tumors which form metastases, the former through the lymphatic, the latter through the bloodvessels.

The appearance of the tumor on section sometimes discloses important changes in its interior. As such may be mentioned a beginning of degeneration, formation of cartilaginous nodules, infiltration with calcium salts, hemorrhages into its meshes, etc.

But the most important examination is still to be made, namely, the microscopical. The tumor may be examined in its fresh state, or may be hardened and carefully examined at a later period. Many times circumstances demand an immediate examination and diagnosis. This may be done by hardening the small mass in a freezing microtome, or, better still, to tease carefully a small section and compass them between two cover glasses, grinding them slowly to make as thin a layer as possible. The cover-glasses should then be separated by gliding one off from the other (not picking it off), and mounting temporarily in glycerine or brine. To stain these fresh specimens I use a 25 per cent solution of glycerine and ammonia (carmine solution), it serving at the same time as a mounting medium. The tumor cells take the stain kindly, and permit of a very satisfactory examination. To make permanent specimens, I harden the tumor in alcohol, and stain with hæmatoxylon or ammonia carmine.

The position that the microscope takes is then a most important one. Upon its decree depends the diagnosis, prognosis, and treatment of the tumor in question,

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and the involvement of the life and happiness of the patient.

Several cases which have recently come under my observation, illustrate better than words the value of the microscope in this branch of our science.

Case I, referred to me by Dr. R.: —

Scrapings were brought me, taken from a growth seated in the larynx just above the vocal cords. Two previous examinations by skilled pathologists had been made, and both declared the neoplasm to be non-malignant. Continuing to increase in size, and complicating the normal functions of the trachea and esophagus, the tumor was removed and sent me for examination, which was immediately made. My diagnosis was carcinoma of the larynx, and with it the prognosis and treatment. The infiltration of the neighboring tissues had advanced to such a stage that laryngotomy or even total extirpation of the larynx was contra-indicated. The treatment was directed toward relieving the pain and suffering. A few weeks later the patient died. Had, perhaps, several examinations by the three pathologists been made early in the disease, and unity arrived at, a timely operation might have prolonged the life for several years.

Case II, referred to me by Dr. M.: —

Mary F., 20 years of age, born in Ireland, entered the Sisters' Hospital, Buffalo, N. Y., on Nov. 14, 1890, with the following history: She is a domestic and has been obliged to do a great deal of sweeping, during which the handle of the broom rubbed against the breast-bone. She ascribes her complaint — a tumor on the breast-bone — to this cause. The swelling first appeared eleven months ago, and has been growing larger steadily, till now it is the size of half an orange and extends from above the third to below the fifth rib. Four months ago the glands in the right axilla commenced to swell, and there is now found here a conglomeration of glands as large as two fists, completely filling the whole axilla, but yet somewhat movable. Two months ago the glands in the left axilla commenced to swell and are now as large as a hen's egg. During the last few weeks the glands in both supraclavicular regions have commenced to enlarge. The tumor over the sternum is immovable, presents a feeling of false fluctuation; the skin is normal in color and not adherent. She has sharp, shooting pains radiating from the tumor in different directions; has lately commenced to lose flesh, but is yet in pretty good health. There are no symptoms of any growth in the anterior mediastinum, such as hoarseness, displacement of heart, difficulty of breathing, or interference with circulation.

An examination revealed, to the surprise of all, the most malignant of malignant tumors — a melano-sarcoma. Carefully removing every vestige of the growth and the infiltrated glands, and by strict antiseptic precautions, the wound healed nicely. To the present day, the patient has suffered no relapse, which to her will mean certain death. Had the microscopic examination been neglected or discarded in this case, a different condition of things would have been the result.

Case III, referred to me by Dr. F.: —

Scrapings were sent me coming from the cervix uteri of a middle-aged woman. The diagnosis arrived at by the physician, and one perfectly justified by the age, history, and symptoms of the patient, was carcinoma uteri. A complete hysterectomy was the operation in view. The microscope, however, radically altered the plans of the gynecologists, and a curette was substituted for the scalpel in the removal of a uterine polypus.

Generally the characteristic tumor tissue is easily recognized and correctly diagnosed. Some trouble is encountered in diagnosing some forms of the carcinoses, especially if degeneration or breaking down of the alveolar structure has taken place; but in such instances the complete examination must afford some light as to their character, and a probable diagnosis can be determined upon. Should such a tumor occur on dangerous ground, several examinations by one or more skilled pathologists should be made, and, if possible, the different views unified.

Bearing these few suggestions in mind, then, it is not the most difficult task to make a correct diagnosis of a morbid new growth.

To illustrate the value of preliminary examination, I will cite a few cases of brain tumor which have lately come to my notice: —

Case I. — A brain presenting a large ovoid mass in the left frontal lobe was brought me for examination. The tumor was gelatinous in appearance, soft, compressible, almost fluctuant. These few

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qualities left no doubt in my mind as to its being a myxoma, and the microscopical examination verified my diagnosis. These tumors are of rather frequent occurrence in the brain, since the neuroglia is allied to mucous tissue, and is consequently prone to engender tumors of this variety.

Case II.— An autopsy was made on a man who *intravitam* was declared to have a tumor either in the interior or base of the brain. On removing the cerebrum from the skull, a large pearly white mass was found at the base of the brain cephalad of the pons. It was composed of white, rounded pearls, with a nacreous luster, packed together in dense concentric masses. The peculiar appearance due to the closely-packed, thin cells is characteristic of the cholesteatoma, a tumor of endothelial or epithelial origin[1] growing from the membranes at the base of the brain.

Case III.— A brain was sent me from a neighboring city for examination. I found the hypophysis or pituitary body — normally the size of a bean or pea — about as large as a marble, and producing pressure upon the chiasma cephalad and caudad, it was partially planted in the space between the crura. On cutting the periphery, a gritty, rasping sound was heard, and on cutting deeper, the scalpel came in contact with a hard, stony substance. The cut surfaces were chalky white, with many glistening points, and crumbled into minute particles. My diagnosis was calcareous degeneration of the pituitary gland. On examining under the microscope, minute crystals could be seen throughout the field, while the larger portions appeared dark by transmitted light, white and glistening by reflected light. On adding a drop of strong nitric acid under the cover-glass, these calcareous masses (carbonates and phosphates of calcium) dissolved, and the evolution of carbonic acid gas could be distinctly seen under the microscope.

These few cases are sufficient to show the great importance which the microscope bears to the subject of morbid growths, and to the surgeon whose aim is the honest and conscientious discharge of his duties. The experience which has been gained justifies me in drawing the following conclusions : —

1. That a tumor should be examined as early as possible by one well versed in pathological microscopy.

2. That repeated examinations should be made from time to time, particularly if the clinical history is one arousing any suspicion as to its character.

3. That when a tumor occurs on dangerous ground, the services of two or more skilled pathologists should be called into requisition, and its nature carefully determined.

[1] Authorities differ as to its origin.

DEDUCTIONS FROM TAPELINE MEASUREMENTS.

BY PROF. HENRY CLARK.

When a series of examinations of men by tapeline has been made, it is yet a rather difficult matter rightly to read their significance. We know that not every increase in girth is a decided benefit to the man; nor, necessarily, does even a considerable decrease in general girth measures betoken any detriment to his condition or to his improvement in right lines, but that the particular nature of such changes as may have been noted is what is of most value. Changes of what kind? These can be explained, I believe, by a very simple principle, one which is long, perhaps, in attaining and realizing, which yet takes but a word in stating: that symmetry, or a proper proportion of parts to each other, is the best, or in some cases the sole and unanswerable, test of whatever good condition the man has attained. Whenever the condition of the subject is such, then, that he tends toward greater symmetry, is it reasonable to guess, in the absence of other data, that he is nearing a better condition, so that what treatment he has been following out to restore him from a bad or low condition is likely to be so far grateful and significant of improvement? But when a decided aberration from normal proportion not only persists but increases, we may look in this case for some diminution of his vitality or his strength, if he is a well man, and for positive ill health if he is ailing. These, if they be only indications, ofttimes prove valuable as such, and may show when a physician may look for and correct pathological tendencies.

In one's own experience, it is also of benefit to have the judicious eye of a

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practical trainer upon him from time to time, who, tapeline in hand, may verify any faulty judgment the eye, unaided, may make. For nothing is so delusive, as we all know, as a hasty glance where exactness is desired. There is at this time, in a gymnasium where the writer daily exercises, a well-developed, heavy, but quite active college athlete. To the eye, this man is a puzzle. All usual tests are at fault when one would account for his excellence in boating, football, and such games in general as require readiness as well as force. For to the eye, in his usual gymnasium dress, he appears faulty, in a small waist and narrow pelvis, — a condition fatal to strength, push, or staying-power, and not entirely consistent with robust health. Yet he is a good man, in spite of all apparent defects, and they the most radical. It was only when this man was seen without his parti-colored costume that the puzzle came to a clear solution. The dark-blue "trunks," the white shirt, distorted to the eye (by a well-known delusiveness of vision), a make-up which is really symmetrical, so that without in this case any actual application of the tapeline, one could readily correct, when the man stood before him, unclothed, that erring judgment made by what appeared to the unaided eye a false proportion of elements of excellence. But it must be said, after all, that a tapeline examination would alone decide what kind of man he is, and show that after we can learn by inspection all which can be seen, the test of actual measurement is ultimate knowledge.

Two other instances arise. A first-rate man, who has a record for local results in several sparring bouts, has for two or three years at a time been in course of occasional exercise in gymnasia, where, to the eye, in his ordinary gymnasium costume, he appeared to the writer to be over-developed in chest, and consequently too small across the pelvis for symmetry. I happened not long ago to step into the locker-room where he was about to be handled by his trainer, for a coming glove-contest. (He whipped his man a few days afterward, showing good, sound condition.) I saw while the trainer was rubbing down his man, that the man was remarkably well-developed in the region where he seemed to have been defective, and, whimsically enough, to be so broad across the pelvic line that he himself asked me if I thought his proportions were altogether masculine.

A second case exactly like the first is seen in the excellent breadth of my own instructor's proportions, who seemed on the stage awhile ago, at an exhibition (before he was seen at the better advantage of a late observation), to be quite out of proportion in a thin pelvis and narrow hips. He is, as I know very well, an excellent man, and barring a rather too rough skin and slightly too small pulsation, is as good a man as the average of athletes. These comments may be thought of in the way of caution in judging, and of recommendation to wait for a disclosure of the subject before a conclusion is reached. And at the risk of telling what some of my readers know quite as well as I, it must be said that I do not find the artistically beautiful man always to be a good man. In his street costume the athlete appears always to me to be "round-shouldered." So he is. The extra training (perhaps early in life) of his shoulder-muscles has unduly, though not by any means excessively, enlarged the shoulder and back, so that he is actually thicker through than other men in this line, as may be shown if a girth be taken round the shoulder. Yet this may not be a defect.

Talking a few days ago with two "tumblers" who are now training for the stage, one told me that his neck girth was normal when he began training for the "three-brother-act" he is soon to be engaged in, but was soon so much increased as to be quite noticeably larger than usual. A beautiful fellow, who has been recently getting ready for a trapeze act, standing on his head being a part of the act, has a variation of two inches in favor of neck-girth over calf-girth, which he thinks is the result of his exercise. The diagonal neck muscles are not larger than usual, but the side muscles alone. He has likewise a thickening up of such muscles as aid him in steadying himself while head downward, the thick inside shoulder-muscles being noted, as used. This man is about twenty-three years of age, and consequently subject yet to some variations, by means of special movements, as he trains for his work. None of these little extra differentiations, however, spoil the general symmetry of these persons, who are altogether very good men, and in excellent condition. It is in

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abnormal variations that we find material for judging of bad condition, in a big extra growth from natural causes. But, spite of what has just been said, these two or three cases should be esteemed rather unexpected or unusual cases, so far as showing the results of special exercise developing muscle in certain places is concerned. The truth is, as we all ought to be apprised, that exercise, unless in restricted cases, does nothing of the kind. These are exceptions, and so have been cited. For when a man has become what he is intended to be in his ordinary development, exercise will not, generally, greatly change his dimensions.

THE ANTI-SPITTING ASSOCIATION AGAIN.

MORRIS GIBBS, M. D.

An article in your February issue, on an "Anti-spitting Association," meets with my approval from its relations to the demands of the general public, as well as from obvious reasons of common decency. However, in your endeavor to advance public health, together with a desire to promote æstheticism, you incline toward advocating a well-known plan which cannot fail to continue a general evil. You broach the subject with this sentence: "Spitting, except in a proper receptacle, should be prohibited by law in all public buildings, carriages, omnibuses, street-cars, railroad-cars, steamboats, etc." You thereby intimate that you consider the cuspidor as a proper and necessary adjunct of all public places and conveyances. In this you are simply sustaining an old and much-abused custom; a custom which will in time, I hope, be completely abolished.

There is no more sense in supplying railroad-cars, station houses, and other public houses with cuspidors, than with bed-room crockery. It has long been recognized by thinking people, that the presence of spittoons was not a necessity, while their absence is noticeable in churches and the better class of places of general assembly, as well as in private houses of people of refinement.

Man is the only animal that I know of, of habitual spitting habits. Yet this proclivity is acquired, and if not stimulated by the use of masticatories or tobacco, is, in health, readily controlled.

Spittoons, then, are to be alone considered as essential to the male sex, and we may recognize in the nuisance, a desire on the part of all who tolerate them, to uphold a worse than heathenish custom. But, much as I object to promiscuous spitting about the streets and floors, I must confess, that, from a sanitary standpoint, it is, to my way of thinking, far less liable to promote disease, than is the use of cuspidors, as too often followed. The minute organisms, said to exist in saliva and sputum, are more liable to increase and become an ultimate source of infection, when massed together in a common receptacle, than when isolated and subjected to the devastation of natural forces. Neither is this assertion invalidated by your expression regarding the drying of the sputa and the entry of the dried particles into the air.[1]

An anti-spitting society might accomplish much in the way of promoting public health; but I apprehend that more could be accomplished in cleanliness and good manners by worthy example and sensible advice. It is fair to say that the aims of any association under this fad — and it may be called a fad — will not succeed so long as spittoons are strewn about our private houses and public buildings.

The man who hawks on the street and constantly clears his throat in company, or expectorates indiscriminately, whether walking or sitting, is surely an object of dread to all refined natures, if not an actual menace to public health in general. I have known one pachydermatous individual, who was suffering with lung trouble, and yet thoughtless enough to foist his undesirable presence on a group of men, quickly clear a room or office of his erst-while sympathizers by coughing, hawking, and spitting in a handy spittoon.

As suggested, the best way for public health and (I may add, for sensitive people) is to have a law to fit the condition, or crime, if you will. As a future measure we can best adopt the plan adopted in certain Pennsylvania schools mentioned, as by early education we may expect to accomplish the most lasting results, and we may add too, discard the cuspidor entirely.

[1] A common place for cleaning cuspidors is on the front walk, the contents being poured upon the pavement. This is a quite general practice with barber shops and cheap hotels and saloons.

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TRANSLATIONS AND ABSTRACTS

[The articles in this department are prepared expressly for this journal.]

TREATMENT OF HEPATIC AFFECTIONS.

BY DUJARDIN-BEAUMETZ,

Member of the Academy of Medicine, Physician to the Cochin Hospital, Paris.

Translated by J. H. Kellogg, M. D.

CONGESTIONS OF THE LIVER.

CONGESTION of the liver is a clinical symptom which appears in a great number of disorders. It is necessary, then, first of all, to consider as methodically as possible the etiology and pathogeny of hepatic congestions, for these affections especially require in their management the application of therapeutic means to the first cause of the disorder. Here is one of the applications of what has been described under the name of therapeutic etiology, that is, the treatment of causes. But before entering upon this part of my subject, it would be profitable to review the symptoms by which we are enabled to recognize hepatic hyperæmia. I shall not attempt to present all the symptoms of congestion of the liver, but only those which are the most important.

In the symptomatology of hepatic congestions, there is one symptom which is especially prominent. It is the increase in the volume of the liver. In order to detect this increase in size, we employ two means,— percussion and palpation. Percussion has been highly praised as a means of diagnosis, but I consider it one of the most unreliable means of detecting the increase in the volume of the hepatic gland, and have often heard Barth make the same remark. Many causes may modify the line of dullness of the liver. The liver is not fixed in its position, but is more or less movable. This mobility may be very greatly exaggerated, producing a condition which may be termed movability of the liver, as has been pointed out by some Italian authors. Gerard Marchant recently presented a case at the Academy in which he had been obliged to perform an operation for the fixation of the liver, such as is done for the kidney. ' This mobility of the liver enables it to assume such a position that only a small portion of it can be mapped out by percussion, and at autopsies, one is often astonished to find enormous livers, which, by percussion, had appeared to be livers of small volume. The lung and the intestine introduce other causes of error, without speaking of pleurisy, which sometimes produces a dullness

FIG 1. — Position of the Physician and Patient for Employing Glénard's Method of Palpation.

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continuous with that of the liver. Emphysema also should be mentioned, which lowers the line of resonance of the lung and depresses the diaphragm, thus rendering very difficult the percussion of the posterior part of the liver. Tympanitis, either of the stomach or of the intestines, often renders it impossible to ascertain with exactness the limits of the liver.

These causes of error place percussion in the secondary rank as a means of determining the position of the inferior border of the liver. Palpation is a better means of diagnosis, but in order to utilize the advantages of palpation, it is necessary to employ certain subterfuges. First of all, it is important, and this is a capital point, to cause the patient to execute deep inspiratory movements. My master, Behier, strongly insisted upon this point, and with good reason. Thanks to these forced inspiratory movements, the diaphragm depresses the liver, and the hand applied upon the abdomen and pressed beneath the border of the ribs, may explore very completely the entire artificial border of the liver.

There are some cases, however, in which we cannot successfully employ this mode of investigation, as, when the border of the liver, instead of being in contact with the abdominal wall, is incurved and directed toward the posterior side of the abdomen. In these cases it is necessary to employ the method of Glénard, called the "thumb method." In this method, in addition to the depression of the liver by respiratory movements, an effort is made to carry it toward the anterior wall of the abdomen. The following is Glenard's mode of procedure : —

The physician, seated upon the bed of the patient, usually on the right side of the bed, facing the patient, grasps the side of the patient's body just below the ribs, the thumb placed anteriorly while the four fingers are placed behind, and endeavors to force the liver toward the anterior wall. The right hand applied upon the abdomen at the median line, endeavors to fix, immovable as possible, the entire hypochondrium of the same side. The accompanying figures, borrowed from the work of Glénard, indicate not only the position of the physician and that of his patient, but also the different movements which are executed by the hand for the purpose of securing the greatest possible advantages from this method of exploration.

Then, whenever you are not able to define with exactness the inferior border

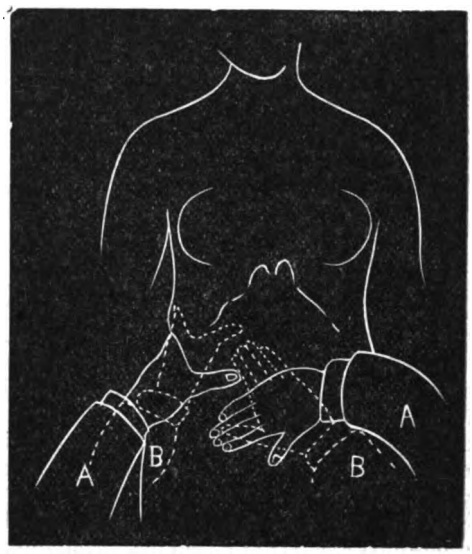

FIG. 2. — Movements of the Hands of the Physician in Glénard's Method.

of the liver by simple palpation, the method of Glenard may be employed. So much for the methods of the physical examination of the liver, by which an increase in its volume may be determined.

To these symptoms it is also necessary to add others which are of notable importance. Certain cases of hepatic congestion are not accompanied with painful phenomena, while in others, on the contrary, the patients experience pain or other unpleasant sensations in the region of the liver, especially in taking a deep breath. There are sometimes, even, sensations of constriction of the chest at the level of the xiphoid cartilage. These symptoms are not so much a result of the congestion of the liver itself, as are the peri-hepatic disturbances which so frequently accompany these congestions. The sensations of constriction of the chest are the result of adhesions about the liver. These symptoms appear especially when the liver tends to return to its normal size.

Another very constant symptom is urinary disturbances. It may be asserted that no congestion of the liver exists without the appearance of urobilin in the urine and often also of bilirubin. The method recognizing this substance in the

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urine has already been given in the preceding lessons.

In connection with this alteration in the urine, there is also a modification of the complexion. The eyes and also the mucous membrane, acquire a slight brownish tinge; and sometimes a true icterus, but more often a sub-icterus complexion, accompanies hepatic congestions.

To these three great symptoms, an increase in the volume, painful phenomena in the region of the liver, and the presence of urobilin in the urine, it is necessary to add febrile symptoms.

Monneret, who devoted much time to the study of hepatic congestion, and who gave an excellent description of this condition, called attention to the remittent and intermittent character of febrile phenomena in hepatic congestion. According to Monneret, this is a characteristic symptom of this condition. To-day it is necessary to modify that opinion somewhat.

While it is true that intermittent febrile phenomena are very frequently encountered in hepatic congestion, this symptom is much more often the result of infection of the liver than of congestion itself. I have already told you, in a preceding lesson, that in the physiological state the bile contains no micro-organism, and that in spite of its intimate relation to the intestine. But in the pathological condition, microbes enter the biliary passages, and infect the liver. It is to this microbic invasion that you must attribute these intermittent febrile phenomena, which sometimes assume a very grave character, sometimes actually constituting actual pernicious fever.

Aside from these symptoms, there exist still others of a very important character. These are secondary symptoms; for example, we observe an increase in the volume of the spleen, more or less serious disturbances of the portal circulation, and particularly the production of hemorrhoids. The occurrence of hemorrhoids in affections of the liver was known to the ancients, and Stahl attributed to this symptom a capital importance. The cardiac circulation may be disturbed, and Potain has shown us what changes occur in the right heart in patients suffering from chronic disease of the liver.

Finally, the digestive functions are disturbed, and as a result, we find in patients suffering from congestion of the liver a bad state of the general nutrition, from which results rapid emaciation and notable deterioration of the bodily forces.

There is another secondary trouble which possesses great importance from a therapeutic standpoint. This is the occurrence of certain hemorrhages, and particularly obstinate nosebleed.

These secondary symptoms have sometimes been unduly exaggerated. Poucel has divided them into three classes,—mechanical disturbances, reflex disturbances, and trophic disturbances. Our *confrère* of Marseilles has thus made all pathology dependent upon hepatic congestion. Likewise Glenard, who, observing the great frequency of enlargement of the liver in invalids, proposed to substitute hepatism for rheumatism.

While recognizing the great influence of hepatic congestion in the genesis of diseases, it is certainly an error to consider it as almost the sole cause of disease. While the role of congestion of the liver is exaggerated, on the one hand, it is, on the other hand, by others too much restricted. In the recent treatises upon hepatic affections, congestion of the liver is scarcely noticed; for example, in the excellent treatise of Ladabie-Lagrave, the chapter devoted to congestion of the liver is very short and is devoted entirely to etiology. The same is true of the very remarkable work which Chauffard has devoted in Vol. 3 of the *Traite de Medicine* to diseases of the liver and the biliary passages. He devotes himself almost exclusively to the cardiac liver, as does Labadie-Lagrave. I believe that the truth is between these two extreme opinions, as I shall endeavor to demonstrate.

I pass now to a consideration of the etiology and the pathogeny of these affections. Many divisions have been proposed for grouping in a mathematical manner the different cases of hepatic congestion. I propose the following division: In the first class we will place congestion the origin of which is the intestinal canal. These will be congestions of gastro-intestinal origin. This group is much the largest, and we shall be obliged to make several subdivisions, in order to study it fully.

In the second class, we will study congestions of infectious origin. Infectious diseases and malarial poisoning will be included in this group.

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In the third class we will place diathetic congestions; for example, the hepatic congestions so frequently encountered in rheumatics.

In the fourth class we shall find congestions of mechanical origin. To this type belongs the cardiac liver.

Finally, we will range into the fifth class, hepatic congestions which result from a local cause, or which precede inflammatory phenomena of the hepatic gland. Wounds of the liver, foreign bodies in the liver, hepatitis, etc., belong to this group; but as this last class does not give rise to special considerations from a therapeutic point of view, I cite them here only for the purpose of classification.

Let us now consider the first group. These congestions are the most interesting, especially when viewed from the standpoint of therapeutics. In order to study them well, it is necessary to make the following subdivisions: —

1. Congestions of a purely alimentary origin. Stimulating meats, badly masticated foods, alcohol, etc., belong to this group.

2. Congestions due to toxines, either those which result from indigestion or which are derived from the food itself.

3. Poisoning by lead, arsenic, phosphoras, etc., from which result congestions of the hepatic glands.

Let us now examine briefly these three subdivisions. The most frequent cause of hepatic congestion is dietetic excesses. And it may be said that all great eaters, and especially great drinkers, are subject to these congestions. In countries where excessive eating is general, as in Germany, in Russia, and in the northern portions of France, these congestions are very frequent. They are also often observed on the seashore among persons who are accustomed to reside in large cities, who go to spend the summer season at the watering places. Their appetite is greatly increased by exercise and the sea air, and as they make large use of fish, especially of shell-fish, congestion of the liver occurs very speedily. This congestion may be said to be almost universal. In addition to the conditions above mentioned, we have a high temperature on the Mediterranean, at the resorts of the Riviera from Hyères to Mentone. Thus, cases of hepatic congestion of this sort are very frequently encountered. Rapid eating and the incomplete mastication of foods, by favoring gastro-duodenitis, also predisposes to congestion of the liver through inflammation of the bile ducts. These facts have been well brought out by Naunyn in relation to the pathogeny of biliary lithiasis.

But the first place incontestably belongs to alcohol. Recalling the fact that all liquids introduced into the digestive tube and absorbed by the portal vein, pass through the liver, it is apparent that all irritating liquids must be a cause of hepatic congestion.

Lead, arsenic, copper, and other metallic poisons, by fixing themselves in the liver, produce temporary or chronic congestion of this organ. In a subsequent chapter I shall consider those congestions of the liver which result from toxines contained in the food, such as tainted fishes, game too long kept, and canned lobsters, — causes of hepatic congestion which are sometimes very serious. The mechanism of such congestions is easily understood. It is by exciting the activity of the hepatic cells that a flux of blood is produced, resulting in congestion.

In other cases, the congestion is the result of toxines produced in the gastro-intestinal tube as the result of indigestion. To Bouchard belongs the credit of having been the first to show us the predisposing influence of intestinal dilatation in the production of congestions of the liver. The vicious fermentations which result from dilatation of the stomach occasion the formation of putrid products, which absorb from the surface of the intestine, and which exert a damaging influence upon the hepatic cells.

A very important role should also be attributed to inactivity of the large intestine. Absorption of putrid products occurs most easily from the fæcal matters of the large intestine, resulting in a group of pathological symptoms to which Bouchard has given the name of "stercoremie."

This absorption of toxines is encouraged by the too rapid shedding of the epithelium, and by ulcerations of the mucous membrane. It has long been shown that in dysentery, ulcerations of the colon are the origin, not only of congestions of the liver, but even of hepatic suppurations. But it is only in recent years that attention has been called to the frequent cases of hepatic congestion

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which are observed in patients suffering from dilatation of the large intestine, and in rheumatic and nervous patients affected by that curious disease which has been described under the name of "pseudo-membranous colitis."

Typhoid fever forms an intermediary group in which we find, as causes of congestion of the liver, both ulcerations of the intestine and the presence of a special microbe in the economy.

In the description of the different forms of typhoid fever given by Chedevergne, he describes the hepatic form. There clearly exist, in fact, some cases of typhoid fever with notable congestion of the liver. There is a true form of bilious typhoid fever. But it may be said that the majority of infectious maladies may be accompanied by a congestion of the liver.

Since Laverane has shown that special organisms are developed in persons suffering from malaria, we must place in this group the congestions so frequently produced by malarial fever. It may be affirmed that there is no case of profound malarial poisoning which is not accompanied by a congestion of the liver. This is a most frequent cause of hepatic affections among Europeans living in hot countries.

Certain diatheses are a cause of congestions of the liver, in the same way as infectious maladies. Although we are ignorant of the intimate mechanism of this congestion, it is nevertheless certain that in rheumatics and in patients suffering from skin disorders, we frequently find congestion of the liver. As in dilatation, the biliary calculi are frequently found in these patients, we may properly inquire if these congestions are not more dependent upon one or the other of these conditions.

Finally, in the third group are to be found persons affected with heart disease as the result of mechanical congestion of the liver. All patients suffering from an organic affection of the heart, and in whom the muscular walls of the heart are no longer able to peform the tasks imposed upon them, sooner or later suffer from an increase in the volume of the liver, which results from a stasis of the blood in the right auricle, and consequently, in the inferior vena cava.

It should be well understood that in some affections of the right heart, mechanical congestion of the liver occurs with great rapidity, and that in a case of tricuspid insufficiency, this congestion is the rule. But the same is also true of the left heart, for there is a mass in the lesser circulation, as the result of mitral lesions, which induces distensions of the right heart, and consequently the mechanical disturbances of which I have spoken.

In all cases in which an asystolic condition of the heart is found, we encounter the complexion characteristic of the hepatic congestion. Such persons suffer from weight and pain in the origin of the liver, a pressure in the hypochondriac region which produces more or less severe pain.

In his description of the cardiac cycle, Peter has well shown the influence of congestion of the liver upon the production of this general state which has been called "cardiac cachechsia," and has indicated how a disease at first absolutely local becomes a general malady.

(To be continued.)

THE HYGIENE OF CONSUMPTION.

[In view of the fact that from one fourth to one seventh of all deaths in old and thickly settled districts are the result of one disease, viz., pulmonary phthisis, or consumption of the lungs, everything pertaining to the hygiene and treatment of persons suffering from this malady is possessed of very great practical importance. This will be still more clearly recognized as true, when the fact is recalled that examinations after death of persons dying in city hospitals show that more than one half of all such persons have suffered at some time in their lives from pulmonary ailments closely allied to consumption, and so serious in character as to have left behind distinct evidence of their existence, in structural changes in the lungs. We translate the following suggestions respecting the treatment of consumption from the pen of G. Daremberg in *La Médecine Moderne*.—J. H. K.]

The consumptive should not allow the heat of his room to be above 60°, so that he shall not experience too great a change of temperature when leaving his apartment. The heating of the room should

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not be obtained by means of a stove which produces a dry heat. In dry, hot air, consumptives experience a sensation of oppression, and are not able to expectorate, and, since the expectorated matters of consumptives contain a considerable quantity of purulent and toxic matters, the retention of these matters in the system gives rise to fever. When a consumptive is obliged to live in a dry atmosphere, or if the external air becomes suddenly very dry, he should hang up in his bedroom wet napkins which will moisten the air by evaporation, or should add moisture by means of an atomizer. As soon as the expectoration reappears, the fever and oppression will cease, the matters forming the sputa, which have been agglutinated to the surface of the bronchial tubes, easily detaching themselves when brought in contact with moist air. In the house of a consumptive, the heaters should be placed in the hall or ante-room, the bath-room or basement. The sitting-room, the sleeping-room, and the dining-room should be warmed by indirect heat. The dining-room should not be lighted by gas jets placed overhead. I have seen many consumptives become so much congested that they even raised blood when placed under gas jets at the table in the dining-room of a hotel.

Friction and sponge-baths should be a part of the regular hygiene of the consumptive, for the purpose of stimulating the activities of the skin. Excitations of this great nervous surface react with great energy upon the general nutrition. Every morning and every evening the whole surface of the body should be rubbed with a stimulating lotion, as aromatic alcohol or essence of turpentine. After the moist friction, dry friction should be applied with both hands grasping a piece of flannel. When a patient has become chilled during a walk or a carriage ride, he should be placed in a bed, as Dettweiler has shown us, and be made to perspire by dry friction applied underneath the covers, and by this means the bad effects of the chilling may be avoided. Dry, moist friction should be applied at night, in cases in which night sweats occur. They may be applied with the patient in bed, without removing the covers, or the patient may sit up and expose for treatment the different portions of the body successively. The friction should be applied rapidly, and completed in four or five minutes. The temperature of the room should not be, at the time of the treatment, lower than 54°.

When the patient has a light evening fever, or a general debility, it is well to order for him a saline or vinegar sponge bath every morning. For this purpose the patient kneels in the center of a bath tub, when the attendant squeezes upon the back of his neck two large sponges previously moistened in water containing salt in the proportion of a tablespoonful of salt to a quart of water, or one part of vinegar to five of water. After the sponges have been partly emptied by compression, the whole trunk should be vigorously rubbed with them. The water should first be at a temperature of 73°, and should be gradually lowered to 54°. After the bath, the patient should be rubbed vigorously, rolled in a blanket, and placed in his bed in 15 or 20 minutes. These cool baths cannot be prudently prescribed to consumptives who are rheumatic. In such cases Lasegue advises a short immersion in a bath the temperature of which is five or six degrees below the temperature of the body.

Cold douches not less than from four to ten seconds are prescribed by Brehmer and Sokolowski. In the establishment at Goerbersdorf, in 106 cases treated by cold water during six months, they observed 39 cures, 34 cases of marked improvement, 19 cases of improvement, 10 in which the disease advanced, and 4 deaths. But these crude statistics are of no value. The douche should not be applied to all consumptives, as is done by Brehmer and Sokolowski. I am intimately acquainted with two rheumatic consumptives who suffered from pleurisy following the application of the cold douche given by an experienced specialist. Rheumatic or gouty consumptives should not receive the douche. The same is true of those who are suffering from fever and those who have extensive pulmonary lesions. Even in vigorous patients the employment of the douche should not be insisted upon, unless marked improvement is speedily apparent under this treatment.

A hydropathic means greatly employed in Germany and Russia, is a heating compress (*compresse échauffante*), which cannot be too much recommended for consumptives who suffer from painful points,

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between the ribs, or other thoracic pains. Over the painful point, a napkin wrung out of cold water is applied, over which is placed a triple layer of flannel, and over all, a piece of oil-silk or India rubber, the whole being secured in place by a bandage placed firmly about the chest. A few minutes after the application of this compress, the patient feels a gentle warmth, the skin becomes strongly reddened, and an hour after, if the moist napkin is removed, it will steam as if it were taken out of boiling water. The heating compress holds an intermediate place between the poultice and the plaster. It is quickly and easily applied. Respiratory gymnastics must be recommended to those consumptives who have atrophy of the thoracic muscles and that narrowness of the chest, and that prominence of the sternum called "chicken-breast," but should not be prescribed to patients suffering from congestion, fever, or developing lesions. These exercises produce excellent effects in patients suffering from cicatrized lesions, with surrounding emphysema. They cause the pure air to enter the depths of the air-cells, removing the carbolic acid gas and the accumulating infectious secretions.

Pulmonary gymnastics may be employed without apparatus. Each consumptive should take, in the open air every fifteen minutes, a few deep inspirations and expirations as complete as possible, breathing through the nose. Nasal respiration is preferable to mouth-breathing, because it is slower. Increased fullness of respiration allows diminution in the number, thus lessening the mechanical work.

To deep breathing, slow and rhythmical movements of the arms may be added. Dailly requires that the patient should place himself erect against a wall, either in the open air, or in a room with open windows. The arms should then be brought forward to a horizontal position, then separated, then slowly moved in a horizontal plane to the sides, making the form of a cross, care being taken to develop the chest as much as possible. The arms are then returned to the first position, and the exercise repeated five or six times. The exercise may be varied by raising and extending the arms laterally from the position of rest by the sides to extension above the head.

None of these exercises should be violent, and they should not be practiced in gymnasiums, which are generally badly ventilated and full of dust. All should be taken in the open air. Boating and horseback riding can be permitted, and then only with great moderation to consumptives who have been apparently cured, for many years. Fencing must be absolutely proscribed.

(To be continued.)

Reflections on the Prevention of Rabies.— A note by Messrs. Kelsch and Vaillard in the "Archives Medicale Belges," page 191, relates the case of a young Algerian of twenty years of age, originally from Tunis, who was bitten in both hands in May, 1892, at Sfax, by a wandering dog. The patient was sent to Val-de-Grace on the 21st of May, and the treatment began on the 22nd at the Pasteur institute. The first symptoms of hydrophobia appeared early in June, that is, twenty-six days after the bite, and fifteen days after the beginning of treatment. He died June 11 at four o'clock in the morning, after having exhibited all the characteristics of the classical furious rabies. The autopsy revealed no special lesions besides the sub-pericardial ecchymosis.

The bulb and different nerves of the diseased regions inoculated in rabbits and guinea-pigs, produced hydrophobia in these animals in a very short time. The same day that this unfortunate man succumbed to the attack of rabies, a report of the autopsy of the dog which had bitten him arrived, relating that nothing had been found to conclude that this animal had hydrophobia. The symptoms and cadaveric lesions are, therefore, considered insufficient by the author to establish a positive diagnosis; as has been well established by the researches of Pasteur, inoculations by trephining, or by injection in the interior chamber of the eye, with rabic virus contained in the bulb of the animals, are the only exact methods of diagnosis. P. P.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Infectious Nephritis Due to the Coli-Bacillus.— Drs. Chantemesse and Widal in *La Médicine Médicale* of Jan. 4, 1893, report a case of pyro-nephritis observed in a woman of 42, following a case of typhoid fever. Microscopical analysis of the urine demonstrated the coli-bacilli in this secretion in great abundance, causing marked fermentation of lactose. From the latter fact alone it follows that this bacillus was not the typhoid bacillus of Eberth, which cannot produce lactose. Furthermore, this germ does not grow a second time in a medium in which it has already lived. It is also possible to make distinction by the fact that the bacillus of Eberth shows, when young, a dozen or more flagella, while in the coli-bacillus their number is smaller, four to six, sometimes eight. J. H. K.

Bank Bill Bacillus.— According to the *Chronica Medico Quirurgica de la Habana*, Drs. Acosta and Grand-Rossi have recently made some interesting discoveries respecting the bacteria which accumulate on bank notes. It has long been noted that bank bills increase in weight with their circulation, on account of the foreign matters which accumulate in and upon them. These bacteriologists have discovered that virulent microbes of a most deadly character, which kill animals very rapidly when inoculated with them, are often to be found upon bank bills. One which was particularly deadly, they named from the effect of its association, the "Bacillus Septicus Aureus." The germs which produce tuberculosis, diphtheria, and erysipelas are also found. The danger of repeatedly moistening the finger while counting bank bills is thus clearly apparent. It is probable that some of the most terrible maladies have been communicated in this way. It occurs to us that it might be a good plan if all banks were required to submit the bank bills passing through their hands, to some efficient form of disinfection, so that the currency of our country might be kept as free as possible from these dangerous enemies to life.

Biology of the Cholera Bacillus. — The *Berliner Klin. Wochenschrift* publishes the following interesting report, translated by the *Medical News*. We produce the article without change.

"Uffelmann reports the results of a study of the life history of the cholera bacillus when exposed to various conditions. He found that the organisms may continue to live in still water, not exposed to the rays of the sun, for one or two days, or even for five or six days; if the water has a temperature of from 60° to 70°, multiplication of the bacilli may take place in the first fifteen or sixteen hours. The bacilli may survive for a day or two days in cow's milk, even though acid fermentation has taken place; at temperatures between 64° and 72°, multiplication may take place in the first twelve or sixteen hours. Upon slices of rye bread, unprotected from the air, cholera bacilli may survive for a day; if the bread be wrapped in paper, the organisms may survive for three days; and if the bread be kept under a bell jar, the organisms may survive a whole week. On the surface of feebly acid butter, the organisms survive for from four to six days; in the interior of butter, a shorter time. On roast meat, protected from drying by being placed under a bell jar, they may survive for at least a week; upon smoked fish, kept under similar conditions, they may live to the fourth day. On the surface of fruit, the organisms, after drying, live from twenty-four to thirty hours; kept under a glass jar, to the end of the fourth day; on fresh cauliflower, from one to three days. Upon the printed pages of a book they live, after drying, for at least seventeen hours; on writing paper enclosed in an envelope, at least twenty-three and a half hours; upon postal cards, for at least twenty hours. Upon copper and silver coins and upon copper plates, the bacilli die in from ten to thirty minutes. Upon textures that are apparently dry, they may survive for four days; upon moist goods, for as long as twelve days, perhaps longer; under the condition last named they may even multiply. Flies may remain infectious for two hours after having been brought in contact with moist cholera matter. The organisms may live for an hour, but not for two hours, upon the dry hand."

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THERAPEUTIC VALUE OF THE BICYCLE.

DR. EGBERT, A. M., M. D., Lecturer on Hygiene in the Drexel Institute, Philadelphia, recently published in the *University Medical Magazine* an article entitled, "The Bicycle and its Relation to the Physician." Dr. Egbert considers the bicycle not simply a means of recreation, but as a most valuable and efficient means of securing physical development, and regards the general favor with which the bicycle has been received and the great rapidity with which it has come into use, not as a mere fad, but as the natural outgrowth of a great necessity and the presentation of a satisfactory means of meeting a recognized want. Those who are unacquainted with the bicycle and its possibilities as an exercise apparatus, may regard the views of Dr. Egbert as somewhat too sanguine; but any person who has himself experienced, not simply the physiological effects afforded by this fascinating form of exercise, but the increase of vigor and endurance, sharpening of the mind and the clearing of the intellect, by a ten-mile spin on a good wheel, will be quite ready to join the doctor in his enthusiasm. The bicycle, Dr. Egbert believes, has come to stay, because it is a necessity, and he predicts that its use will increase with the improvement of the public roads.

The influence which wheelmen and manufacturers of bicycles are exerting upon the country with reference to the improvement in public highways, will result in benefit to the country at large, amounting in pecuniary value to many times the cost of all the bicycles which have ever been made or will be made. If the bicycle does no more for the present century than to reform our roads, its mission will be one of incalculable value. But the individual benefit which the bicycler himself derives from the proper use of his wheel, is the thing in which the physician is particularly interested. In this land of plenty, the prevalence of sedentary habits has come to be one of the most widely spread causes of chronic disease. This, intelligent physicians have not been slow to recognize, and have found no small difficulty in the majority of cases, in getting rid of those underlying causes which constitute the foundation for the great majority of stomach and nervous disorders, namely, the excessive indulgence in rich and highly seasoned foods of all kinds, and deficient exercise.

The famous Dr. Boerhaave said that more dyspeptics would be cured by climbing a bitter-wood tree than by drinking the bitter decoction of its leaves. The great Napoleon depended on fasting and exercise to cure him of acute illnesses of whatever sort. Gladstone keeps himself young by felling four-foot oaks at Hawarden. But there are few men who have the moral courage to resort to such means of cure. It is so much easier to swallow a nerve tickling or fuddling tonic or hypnotic or a dose of pills, than to take a ten-mile "constitutional," swing an ax for a few days, or work at chest-weights or a rowing dummy at stated intervals in a dingy gymnasium.

The bicycle offers advantages to the sedentary man, possessed by no other form of exercise. It brings into activity every muscle of the body. When properly used, it develops the muscles of the trunk, thus promoting correct carriage, though unfortunately many riders assume

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upon the bicycle a most ungraceful and unhealthful attitude. Unlike such humdrum exercise as wood chopping, rowing, or working, the bicycle brings into most active play the nerves and nerve centers as well as the muscles, especially when one selects for his course a diversified country road rather than a race track. The constant occupation of the mind in looking out a safe and suitable road, turning aside to avoid obstacles, making a dash now and then over a stretch of smooth and level road, putting on extra steam to climb a hill, and coasting down the other side, quickens the velocity of the circulation, and the equilibrium, disturbed by too much mental work and too little use of the muscles, aggravated perhaps by excessive eating, is quickly restored, so that it becomes not only a means of muscle work resulting in improvement of nutrition, but an equally valuable means of nerve resting.

The writer first became personally acquainted with the bicycle while spending a winter's vacation engaged in writing a medical work in the city of Washington, D. C. The time at my command being limited to three months, and the task in hand, the production of several thousand pages of original manuscript besides a considerable amount of research, I found it necessary, in order to accomplish my daily task of from fifty to one hundred pages of manuscript, to maintain the highest possible degree of mental and nervous activity, and consequently I found it profitable to devote daily some attention to active exercise out-of-doors as well as the most scrupulous attention to diet. Finding that I always returned from my "constitutionals" fagged and exhausted, besides being constantly oppressed with the feeling that I was wasting time, which made my daily walk exceedingly distasteful, I possessed myself of a Columbia bicycle, and spent one hour daily in bicycle riding, which not only refreshed me from the labors of a long day of incessant and intense mental effort, but prepared me for renewing my work in the evening, and prosecuting it with uninterrupted activity till midnight or one A. M., my usual bedtime.

Last year my personal experience again afforded an excellent illustration of the value of the bicycle as a means of recuperation. A severe attack of *la grippe* confined me to my bed for a month, and left me in a miserable state, from which I seemed to be unable to rally. During the attack, the chief center of the disease was my right lung, which remained sore, and my breath so short and the occurrence of evening rise of temperature so frequent, I had grave apprehensions of beginning tuberculosis. My heart was also exceedingly weak, the heart beats frequently reaching 140 to 150, even without the provocation of active exercise. Finding it impossible to divest myself of the cares incident to the superintendence of a large Hospital and Sanitarium, with 600 to 700 people constantly under my supervision, requiring from half a dozen to twenty serious operations two days in a week, besides the labor of a very large correspondence and the literary work demanded by the editorship of three monthly magazines, I saw little chance for escaping a complete and possibly hopeless breakdown in health. In this emergency I recalled my former happy experience with the bicycle, which the urgent press of professional work had led me to neglect for several years, and procuring a good safety bicycle, I began renewing acquaintance with the wheel.

I was at this time so weak and short of breath that I could not climb a short flight of stairs without much effort, and without finding myself out of breath. My first trip on the bicycle, a distance of less than forty rods, left me with lungs and heart so excited that I was obliged to place myself in a horizontal position, and remain absolutely quiet for several hours before the heart beat resumed its

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normal rate. The second trip, a day or two later, of about the same distance, was recovered from in an hour or two, a fact which gave me courage to persevere, and by the end of two weeks I was able to ride half a mile without becoming completely exhausted, although still very short of breath. At the end of a month, however, I found to my delight that I had fairly good "wind"— was able to ride ten miles in an hour over a road only fairly good, climb hills of considerable steepness, and had increased my lung capacity from 175 cubic inches to 210.

In another month my general muscular strength had increased to such a degree that my total lifting ability, including strength of the extensors as well as the flexors, was over 5500 pounds.

I felt that the bicycle had saved my life. Certainly it did save me from a complete breakdown, which, at the time, would have been most disastrous.

I have employed the bicyle as an accessory in the treatment of weakly women in dozens of cases, and with most happy results. I have never seen any untoward results from its use, except some slight bruises, which were wholly the result of carelessness on the part of the riders. With a good teacher and prudence on the part of the pupil, even these may be avoided. The majority of chronic invalids need more muscular activity than they have been accustomed to. Exercise involves increase of lung activity, and with increased vigor of respiratory movements come better liver action, improved digestion, accelerated absorption of the digestive products, better bowel action, purified blood, and more normal activity of brain and nerves.

The majority of those who take exercise for health do not take exercise enough to accomplish the purpose required. To accomplish its object, exercise must be sufficiently vigorous and sufficiently prolonged to induce a decided impression upon the system — old tissues being broken down and the process of nutrition, assimilation, and disassimilation sufficiently stimulated to oxidize and carry off old waste elements and build up newer and better tissue.

For neurasthenia, nervous dyspepsia, rheumatism, general debility, hypochondria, brain fatigue, diabetes, and other difficult, common, and obstinate maladies which I might mention, the bicycle affords, in connection with simple diet and correct habits of life, one of the best means of cure. For the last-named disease, in curable cases, it is worth more than all other measures combined. By its use the amount of sugar eliminated may be diminished, and in favorable cases it may be made to disappear entirely. But the absolute restriction of diet required in such cases often becomes intolerable to the patient, so that he breaks over the rules laid down for him, and suffers the consequences, feeling that the remedy is worse than the disease. The bicycle, however, and other equally vigorous forms of exercise, afford an opportunity by which the excessive amount of sugar found in the blood may be oxidized, or burned up, thus rendering absolute restriction of diet to non-starch foods unnecessary. This we have demonstrated in many cases. An eminent French professor suffering from diabetes kept himself alive until an advanced age by vigorous daily work in the gymnasium. A young man observing the gray haired professor at his place regularly every night, engaged with men one third his age, in the most vigorous exercises of the gymnasium, intimated to him his surprise at seeing so aged a man so much interested in athletics. "Ah," said the professor, "you do not understand; I am burning up my sugar." The professor would have found the bicycle a very much more agreeable means of burning up the sugar which his system had lost its power to oxidize without the stimulus of active exercise.

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I have found that feeble women who are scarcely able to ride on a street-car in consequence of pelvic disorders which are aggravated by the jar of a street-car or the rattle of carriage wheels over a pavement, have been able to ride upon a bicycle with a pneumatic tire, not only without injury, but with positive benefit. The development of the muscles of the trunk is one of the most essential things to be accomplished in the treatment of disorders peculiar to women. The neglect of this development, probably because of a lack of convenient means for meeting the requirement, is the principal cause of failure in the treatment of displacements of various sorts and a variety of ailments caused by prolapse of the abdominal viscera. The bicycle affords a most efficient and delightful means of developing all the trunkal muscles. It encourages a correct carriage, deep and full respiration, requiring loose garments, and by its fascination encourages women of feeble physique to increase from day to day the amount of exercise, thus securing gradual and efficient development of the neglected and weakened muscles.

J. H. K.

INTESTINAL STASIS.

EVERY gynecologist who has given careful attention to the matter will be ready to testify respecting the great frequency with which the colon is found to be loaded with fecal matter, in women seeking advice for disorders supposed to be peculiar to the sex. There is no doubt in the writer's mind that the great share of ailments from which women complain, and which are attributed to some disease of the womb or ovaries, may be traced directly or indirectly to static disturbances of the abdominal viscera, such as intestinal prolapse, abnormal mobility of one or both kidneys, dilatation or prolapse of the stomach, etc.

One of the most frequent consequences of intestinal prolapse is stasis of fecal matters in the colon. This accumulation of hard and fecal matter is most common in the descending colon, particularly in the region of the sigmoid flexure or the rectum, and is frequently found in the cæcum, sometimes in the transverse colon. In laparotomies I have frequently found the transverse colon several inches below the umbilicus, and sometimes immediately below the cite of the incision. In a recent abdominal section I found the omentum packed away in the pelvis, the lower border of the transverse colon lying at a point an inch above the pubes. In this instance it was necessary to disentangle the mesentery from the pelvic viscera before the colon could be returned to position. The patient had long suffered from intestinal stasis, the cause of which was evident. A pyosalpinx also existed, however, both appendages being diseased, rendering removal necessary; but I anticipate that as many symptoms will be relieved by the restoration of the colon to its normal position, which I took care to accomplish, as from the removal of the diseased appendages.

In many cases the only remedy for intestinal stasis is a thorough washing out of the accumulated fecal matters by means of what I term, for convenience, a colo-clyster. As suggested by the late Dr. Jewell, who recognized this condition as one of the most common causes of chronic nervous disorders, the colon may be conveniently filled and thoroughly flushed by placing the patient in Simm's position, or in the knee-chest position. The knee-chest position, or the genu-pectoral, is most effective, but for a feeble patient the Simm's position is better. The patient should lie on the right side instead of the left, as the right Simm's position facilitates the passage of the water higher up into the colon.

The only inconvenience arising from

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the frequent use of colo-clysters, is the fact that the frequent contact of the large quantity of water has a tendency to overdistend the colon, and to lessen the sensibility of the lower bowel, so as to render the practice, when once taken up, a permanent necessity. This is not always found to be the case, however, as I have not infrequently observed that in patients whose bowels were clogged, resorting to the colo-clyster for a few times sufficed to restore the natural function so that regular movements occurred daily without artificial aid. These cases are those in which stasis has not continued for a sufficient length of time to cause any considerable degree of permanent dilatation, and consequently weakening of the muscular walls of the intestines. In other words, these are cases in which motor insufficiency is not a permanent factor. But as a rule the adoption of colo-clysters as a means of emptying the bowels is likely to become a habit and a necessity, from increase of intestinal dilatation and lessening of normal sensibility of the mucous membrane of the lower bowels. This inconvenience may be obviated, however, by the employment of either one or both of two simple measures, namely, electricity and revulsion.

As electrical applications I find the slowly interrupted faradic current, the slowly alternating sinusoidal current, and the fluctuating galvanic current, applied with a protected metal electrode, the most effective means.

Revulsion is secured by employing, in the first place, water as hot as the patient can bear, hot water being much less relaxing than warm water and more stimulating to the bowels, and conclude the application by the injection of a small quantity of cold water. The cold water is injected after the bowels have been emptied. Half a pint of cold water, which should be of the temperature of 60° to 80°, is sufficient for the purpose. The cold water is injected and retained for a minute, and then allowed to escape. As a means of maintaining or awakening sensibility in the extreme lower portion of the alimentary canal, I find very useful a hard rubber irrigator which I have had made for the irrigation of the rectum, by means of which, and with suitable connections with two reservoirs, one containing hot and the other cold water, hot and cold water are brought in contact with the mucous membrane, alternating every 3 to 5 seconds.

I also employ for the same purpose an instrument consisting of a hard rubber cylinder, the inner end of which is closed, the outer presenting two openings, through one of which passes a tube to the upper extremity of the cylinder. By substituting this for irrigation, heat and cold without moisture may be applied to the rectum in the same way alternated, being timed to 5 to 10 seconds, the instrument possessing very thin walls, which are quickly brought to the temperature of the current of water passing through it.

By the employment of these means, electricity and revulsion, the tendency of the colo-clysters to produce a sort of paresis of the bowels when employed for a considerable length of time, may be completely overcome, and thus this method of treatment, which has been so so much abused by charlatans, may be utilized without the undesirable results.

J. H. K.

New Method of Using Electricity as a Depilatory. — It has recently been suggested to apply the heating effects of the galvanic current as a means of destroying the hair bulbs, by introducing two fine broaches into the hair follicle on opposite sides of the hair and bringing the points together in the bulb, completing a circuit for a few seconds. This mode is said to be important on account of its not producing scars, and to be more effective than the ordinary method of removing hairs.

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Tea and Digestion.— The popular idea that tea, coffee, cocoa, wine, and other beverages commonly used at meals, promote digestion, has been clearly proven by reliable physiological experiments to be an error. According to J. W. Frazer and W. Roberts, all these substances interfere with digestion. Tea, coffee, and cocoa retard the digestion of proteids, although the action of coffee is somewhat less intense than that of tea. The volatile oil as well as the tannic acid of tea, was found to have a retarding effect upon peptic digestion. It is well that this fact be known, as the idea has become prevalent that tea is harmless if the infusion is quickly made so as to obtain the volatile oil without so great a quantity of tannic acid as is dissolved by longer infusion. Wine also retards peptic digestion, as was clearly shown by W. Roberts. This effect of wine and other alcoholic liquors was so marked that Sir William Roberts concluded, as the result of his experiments, that wine and other alcoholic liquors are chiefly useful as a means of slowing down the too active digestion of the modern civilized man, thus acting as a safeguard against what he terms "a dangerous acceleration of nutrition." However much the digestion of the average Englishman may require slowing down, the average American certainly does not need to put breaks upon his digestive apparatus.

Both Roberts and Frazer also showed that the effect of wines and tea is inimical to salivary digestion. Tea, even in a very small quantity, completely paralyzed the ptyaline of the saliva, while wine promptly arrested salivary digestion. Salivary digestion was not formerly considered a matter of very great consequence, as it was supposed that the action of saliva upon the digestion of food was quickly suspended in the stomach by the secretion of hydrochloric acid; but the observations of Ewald and others, which have been confirmed by the writer in the chemical examination of more than eleven hundred stomach liquids, indicates that salivary digestion proceeds in a normal stomach so rapidly as to cause the complete disappearance of starch by the end of the first hour of digestion. Many cases of intestinal dyspepsia are doubtless due to the failure of salivary and peptic digestions in the stomach. J. H. K.

New Forms of Intoxication.— Most of the new methods of intoxication seem to have originated in this country. Intoxication by ether was practiced by inhaling the drug, many years before it was used as an anæsthetic in surgery. The writer once received a very graphic account of an ether party given by a physician, who was one of the participants. Tea chewing to the extent of intoxication seems to have originated in Boston. Snuff dipping was invented by a woman of the Southern States. Tea cigarettes were, however, the ingenious invention of Parisian ladies who were tired of the ordinary forms of intoxication.

The *Medico*, a French periodical, gives a recent account of a new form of intoxication which is becoming fashionable with Parisian ladies, in which the desired exhilaration is obtained by inhaling the fumes of naphtha. The intoxication induced by naphtha is similar to that caused by ether drinking, as practiced in Ireland, or as inhaled for surgical anæsthesia, but lasts much longer and is very much more injurious. This mode of intoxication, it is claimed, was introduced into Paris by American ladies who had long practiced it at their homes in America.

There seems to be a mania at the present time for the discovery of some new nerve tickle, or some new means of fuddling the senses. It is time the medical profession raised its voice in solemn protest against the use of all felicity-producing drugs, every one of which is toxic and injurious in its nature.

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REVIEWS.

Notes on Apostoli's Method of the Treatment of Uterine Fibroids.— By Plym S. Hayes, A. M., M. D., Chicago.

Myelitis in a Case of Incipient Posterior Spinal Sclerosis.— By J. T. Eskridge, M. D., Denver, Colo. The writer gives a very lucid and interesting account of a somewhat peculiar and unusual case.

Manual Rectifications of Certain Malpositions of the Head in Labor.— By William H. Wenning, M. D., Cincinnati. The author of the paper presents several valuable suggestions, which are illustrated by three cuts.

Galvanism in Gynecology.— By Franklin H. Martin, M. D., Chicago. Dr. Martin was one of the first to introduce Apostoli's method of using electricity in this country, and is recognized as one of its most able and successful exponents.

The Climatic Features of the Pines of New Jersey.— By Dr. Isaac Hull Platt, Lakewood, N. J. The writer of this paper calls attention to the valuable climatic advantages presented by the pine region of New Jersey, a tract of land sixty miles in length and eight to twenty miles in breadth.

Report of the Committee on Criminal-Law Reform.— By Chas. H. Reeve. This report contains numerous sensible suggestions, most of which will meet the approval of every intelligent and thoughtful person. One of the reforms suggested is the abolition of all penalties and the imprisonment of every violator of the law for an indefinite time, releases from custody to depend on satisfactory evidence of reformation.

The Genu-Pectoral or Knee-Elbow Position in Obstetrics.— By W. H. Wenning, M. D., Cincinnati. The author of this paper presents in a very convincing manner the claims of the genu-pectoral position to a prominent place in obstetrical practice. The paper is well worth perusal by any obstetrician.

A Remarkable Case of Dextro-Torsion of the Pregnant Uterus Simulating Extra-Uterine Pregnancy.— By Wm. H. Wenning, M. D., Cincinnati. An interesting paper illustrated by a very interesting case from which the author draws the conclusion that "we learn more by our mistakes than by our successes."

The Use of the Turkish Bath in Inebriety.—By Charles H. Shepard, M. D., Brooklyn, N. Y. A good paper written by a good man, and contains many valuable thoughts and suggestions. The success of the writer in the treatment of inebriety by the Turkish bath amply demonstrates its value in these cases.

Thirty-two Unselected Abdominal Sections. — By Thomas Opie, M. D., Baltimore, Md. A record of thirty-two cases of abdominal sections, three of which were exploratory incisions, with four deaths. The most remarkable feature of the paper is the report of nine cases of stitch abscess, nearly one third the entire number, and the statement by the writer that drainage "ought to be abandoned by the abdominal surgeon." The query arises whether it may not be possible that the author's prejudice against drainage tubes, and the ill effects which he observed from their use, may not arise from the same source as the nine stitch abscesses which the writer very correctly says are "a much larger number relatively" than has been recorded heretofore. The drainage tube without asepsis is a source of danger.

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ORIGINAL ARTICLES.

TYPHOID FEVER IN THE LIGHT OF MODERN RESEARCH.

BY L. BREMER, M. D.,
St. Louis, Mo.

(Concluded.)

Typho-Malaria.— The question of typho-malaria has for decades, since our civil war, during which nearly 5800 cases occurred in the Union army, agitated the mind of the clinician, especially the general practitioner. Clinically, we understand by typho-malarial fever a modification of typical typhoid characterized by pronounced remittence or even intermittence of the febrile movement, at the beginning or at the decline of the process. It was assumed that the miasms which were supposed to be at the bottom of malarial fever, possessed this modifying influence on typhoid fever, when occurring in malarial countries; and that according as the malarial or typhoid symptoms showed themselves first, there was a malarial fever complicated with typhoid, or a typhoid complicated with malaria. Others, again, assumed typhoid-malaria to be a hybrid entity, in the sense of resembling both, but being neither one nor the other.

What clinical observation alone has been notoriously unable to elucidate (for the subject of typho-malaria is as muddled to-day as it was during the civil war), the microscope will probably be called upon to settle. The matter presents itself in this simple form: Are these cases in which, besides the typhoid bacillus and the anatomical lesions peculiar to typhoid fever, the plasmodium malariæ as found in the blood? And, furthermore, is there a disease in which the plasmodium malariæ can be demonstrated in the beginning and Eberth's bacillus later on, and *vice versa?*

Although the notion was quite prevalent in former theorizing times, that one specific infection excluded every other, it is now a well-established fact that two or more different kinds of parasites may be found in the same host, or, in bacteriological parlance, there is such a thing as a symbiosis, or mixed infection; and there is *a priori* no valid ground to object to the presumption that the plasmodium malariæ inhabits the human body in harmony with the bacillus of Eberth. To my knowledge this has not, up to the present time, been demonstrated. In five cases of what was clinically regarded as typho-malaria, my blood examinations were negative; the plasmodium was not found.

Atypical Localization.— The appearance of a pneumonia in one or another of the etiological (streptococcus or diplococcus infections, *e. g.*) and anatomo-pathological (fibrinous or cellular) varieties, has been animadverted to in another place; the atypical localization of the typhoid process in tissues and organs other than the glands of the intestinal tract, has likewise been alluded to. But there is another subject closely related to the preceding one, on which considerable darkness and confusion reigns — I mean the question of typho-pneumonia considered as a disease, *per se*,[1] when in a given case pneumonia assumes a "typhoid" character, *i. e.*, when there is a dry and brown tongue, sordes on teeth and lips, low, muttering delirium, great prostration, tremor and subsultus tendinum, etc., the diagnosis, typho-pneumonia, is readily made. Here then, too, the momentous question arises:

[1] Analogous to typho-pneumonia, and involving the same problem, is typho-nephritis, or nephro-typhoid, which I leave out of consideration because the questions of principles and essentials comprised are the same in this as in the first named.

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Is this form of pneumonia one in which, in the course of an ordinary pneumonia, that rather mythical and nebulous element, "typhoid condition," supervenes? or is it a case of mixed pneumococcus and typho-bacillary infection? or lastly, is the pneumonia due to an atypical localization, in consequence of which the intestinal symptoms are either minimal or do not exist at all? and where, consequently, the pneumonic process of typho-bacillary origin is in the foreground of the clinical picture?

There can be no doubt as to the occurrence of cases belonging to the last-named category, and which cannot be interpreted otherwise than by the assumption, either of a symbiosis of the two specific microbes referred to above, or of an atypical localization of the typhoid bacillus, which, causing primarily an inflammatory process in the lungs, invites and prepares the soil for the diplococcus pneumoniæ as a secondary invader. I stated above that in one case of pneumotyphoid, I found Eberth's bacillus alone. This was a case of the ambulant variety. The lung was not solidified, but was in a state of splenization. The intestinal lesions were exceedingly insignificant, and were those met with in the first week of typhoid fever. Possibly such cases are not so rare as reports obtained so far would lead us to believe, the difficulty of getting exact data on this point being caused by the fact that cases dead with typhoid come to the autopsy table, as a rule, after the earlier stages of the disease are passed. From the expectoration in the early stages of pneumonia in typhoid, the specific bacilli may indeed be obtained by culture, but the diplococci are always present with them, and vastly preponderate in number. Owing to the bronchial catarrh, which perhaps is present in every case of typhoid during the first week, and the secretions of which almost invariably contain the diplococcus, wherever and whenever the catarrh exists, the diagnostic value of the sputum is very limited.

Reverting to the cases of typho-pneumonia, or what is ordinarily understood by that name among practitioners, I would say that the question is not yet ripe for final adjudication. When such cases occur during typhoid epidemics, they may reasonably be set down as real typhoid, with atypical localization in the lungs, the specific bacillus being aided and reinforced by the diplococcus pneumoniæ. If, on the contrary, they are observed outside of a typhoid epidemy, the inference must be that the diplococcus pneumoniæ (perhaps a streptococcus), instead of colonizing in the lungs, pervades the whole organism, setting up a blood-infection, as is witnessed in the animal experiment, where inoculations with the germs peculiar to pneumonias do not have a tendency to localize, but pervade the whole body indiscriminately.

Latent Microbism.— In connection with the preceding remarks it is perhaps appropriate to cast a glance at the theory of "Latent Microbism," as enunciated by Verneuil. According to this observer, a person may be infected without being actively attacked by the disease; that is, the germs may simply camp and entrench themselves in certain organs of the body, waiting, as it were, for a favorable opportunity to break out and attack the organism, as soon as it is in the proper, *i. e.*, weakened, condition, promising, in a coming combat, a victorious issue. As may be seen, this is rather a fantastic way of dealing with a pathological subject, but the thing itself is not impossible. In pneumonia and erysipelas, for instance, latent microbism has been proven almost to a certainty.[1] Possibly a similar state of affairs obtains in the genesis of typhoid fever.

Antispecific Views.—I cannot pass with silence the antispecific views which are still entertained in some quarters in spite of exact scientific evidence of bacterial

[1] The former often develops in a remarkably short time after a severe cold or a trauma. So short indeed is sometimes the interval between the obviously immediate cause and the outbreak of the disease, that the inference of a concomitant bacterial invasion is highly improbable. The assumption that, as in the mouth, so in the lungs, there may lie pneumococci in a dormant, *i. e.*, non-proliferating or harmless state, a state which is at once changed by a weakening of the surrounding cells, explains the apparent discrepancy. In some cases of erysipelas we have likewise a rather cogent proof favoring the theory of "latent microbism." In fresh cases as well as relapses we are constrained to assume the latent presence of the streptococcus, which enters upon an active stage as soon as the surrounding cells, weakened by trauma, cold, or other noxious agents, permit of it. My own conviction is that the axiom formerly held in regard to syphilis,— Once syphilitic, always syphilitic,— is certainly true of some cases of erysipelas.— Once erysipelatous, always erysipelatous! This means that the so-called predisposition to this disease after an attack, consists in reality only in a number of relapses brought about in the manner indicated above. It is my opinion, based on clinical and bacteriological evidence, that the streptococcus causing erysipelas may be dormant in the previously infected body for years, before, under favoring circumstances, the relapse occurs,— a relapse which may, it is true, appear under a clinical form differing from the original malady, attacking deeper tissues and organs. Such cases have, time and again, been adduced as irreconcilable with bacteriological teaching, while in reality they are among the strongest proofs of the microbian doctrine.

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etiology. The exclusive theory of "atmospheric and telluric influences" so much dwelt upon by the writers and teachers of a past period, has still its adherents and faithful devotees.

Others still hold to Murchison's views, which at one time commanded the attention of the medical profession. According to Murchison, any kind of organic matter, but especially fœcal substances, when undergoing an abnormal fermentation, are thought to be capable of giving rise to typhoid fever.

Another class again, with Dr. Peter, the celebrated Paris clinician, at the head, speak of an auto-typhisation, which is perhaps somewhat more in accord with modern pathological views. The poison, in the opinion of Peter, is generated in the body through a faulty metabolism, in a manner similar to the much-talked-of auto-intoxications.

Lastly, Rodet and Roux, likewise French investigators, maintain that the *bacillus coli communis*, a harmless inhabitant of the intestines of healthy individuals, has the faculty of being converted, under abnormal conditions, into the genuine and poisonous typhoid microbe, so that every person carries, so to speak, the germs of a prospective typhoid fever with him.

The upholders of all these views stand, however, rather isolated among the authorities of our profession to-day.

Typho-toxines and Toxalbumins. — As in all infectious diseases, as soon as the specific parasite had been discovered, so in typhoid fever, the cause of the symptoms, above all, that producing fever and stupor, was sought after in the form of some essential, active principle. At a comparatively early stage in the development of bacteriology it was correctly surmised that it could not be the bacteria themselves, but that it was the secretions, to which must be attributed the various symptoms of poisoning, presenting themselves in the course of the infection. At first it was supposed that substances similar to the alkaloids of medicinal plants, were causing the fever, convulsions, stupor, etc., peculiar to the several diseases. The typho-toxine was one of the first of such hypothetical alkaloid-like substances produced. The fact is that it made *some* symptoms of typhoid, when incorporated in animals, but not all. Probably a variety of toxic substances is at the bottom of the symptoms in typhoid, as in other infectious diseases. This question is, however, also far from being settled yet. Of late it is not the toxines, but the toxalbumins, which are thought to be those essential, active principles.

Chemical Explanations of Immunity. — There is a curious experiment, first published by Widal and afterward verified by some other experimenters, which may some day throw light on the vexed question of immunity. It is as follows: If typhoid bacilli are planted on a gelatine plate and developed into colonies, and these colonies be lifted off by sterilized platinum needles, it will be found that any attempt at growing another crop of typhoid bacilli on that same gelatine will fail. In other words, it is immune from the typhoid bacterium.

The inference to be drawn from this experiment is almost too obvious to be specially stated. If we mentally substitute the human body for the gelatine, we have the conception of immunity in a tangible form, and its mechanism becomes comprehensible. Either there is something wanting in that gelatine which to the development of the typhoid bacillus is essential, but which one crop of bacilli has already used up, or the colonies have deposited a substance which prevents a future growth of the same kind of bacteria. Here, then, we have *in concreto* the two views of immunity which for years were struggling for supremacy, the doctrine of addition and that of subtraction or exhaustion. Pasteur was, and is probably still, a partisan of the former view, first enunciated by Klebs; viz., that immunity means the addition or incorporation of some substance which acts as a poison to the several invading pathogenic microbes. Unfortunately, the question of immunity is a very complicated one, and things take place in the living body in a manner vastly differing from that which occurs in dead gelatine.

Nor are the other theories of the immunity question more likely than the preceding one to lift the veil of obscurity from this tangled subject.

Phagocytism. — The most plausible of these theories, and one which for several years has had many adherents among medical men, is that of phagocytism. A few words about this, as far as it applies to typhoid fever, may not be out of place. According to this ingenious conception

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of one of the ablest of living bacteriologists, Metchnikoff, immunity means the capability of leucocytes, which are compared to soldiers, of successfully coping with an invading army of pathogenic bacteria, or in other words, robust health and ample digestive powers of the leucocytes, are equivalent to immunity from infectious disease. For the vigorous leucocytes (called phagocytes because of their devouring capabilities) not only eat the invaders, but also digest them. But however true this may be of other bacteria, no typhoid bacillus has as yet been found in a cell, as in anthrax, which has furnished the basis for the doctrine. The typhoid bacillus always lies between the cells. This is at any rate the unanimous testimony of competent investigators. If, however, phagocytism were applicable to the question of typhoid fever, we would be in possession of a satisfactory explanation of the fact that so many persons get fat and are in better health after recovery from typhoid fever than they were before. The phagocytes, namely, when successful (after they have rallied, owing to the bacteria having become weak in their own poisonous secretions), not only eat the invaders, but also the remnants of their own dead comrades and brothers, and all the debris of the battle-field. This general cleaning up is said to confer on some convalescents an exceptionally good state of health.

As may be gathered from the foregoing, many perplexing questions still cloud our knowledge of the true nature of typhoid fever. Our stock of undisputed facts on this subject is still small, considering the vastness of the material; for bacteriology is as yet in its swaddling clothes.

Sarcosporidia in the Cardiac Muscels of Man.—Dr. Bernhardt Rosenberg (in the *Zeitschrift für Hygiene*, February, 1892), reports a case of endocarditis following pleurisy in the left, in a woman of forty years. In making post-mortem examination, his attention was attracted by a considerable hyperplasia of the endocardium on one of the papillary muscles of the left ventricle. In the center of the muscle he was surprised to find, on section, a cyst about five millimeters long and two wide. At first he thought that he had to deal with a cysticercus. Microscopic examination revealed a striated envelope, like a sort of capillary canal. The contents consisted of various corpuscles; some were small masses of plasma filled with granulations amid which it was difficult and sometimes impossible to see a nucleus; other bodies appeared formed of a hyalin substance, sometimes with and sometimes without a nucleus. The author designates this parasite by the name of *sarcocystis hominis*. This nomenclature may not prove correct, for investigation was not sufficient to arrive at a correct conclusion. It is not established that the parasite was a true sarcosporidia.

Improved Nutritive Enema.—Rectal feeding has come to be so important an adjunct in the treatment of many diseases, as well as a main dependence in the management of a few maladies, that it is a matter of no small importance that the best possible means should be employed for maintaining the nutrition of the patient by this artificial method. The experiments of Huber demonstrated the fact that egg albumen in a state of emulsion is readily absorbed by the mucous membrane of the lower bowel, and that this absorption is facilitated by the addition of a small amount of common salt. Absorption is also encouraged, as shown by Ewald, by the presence of a diffusible substance like maltose or glucose. Glucose is sometimes employed for this purpose in a 20 per cent solution. Glucose, however, is a chemical product to which the natural product of diastase digestion is preferable. The writer finds the following a very satisfactory method of rectal alimentation: —

Make a rather thin paste by boiling a small quantity of whole-wheat flour in half a glass of water. Let it cool till the finger can be held in it, that is, to a temperature of 104–110 degrees. Add one teaspoonful of Trommer's extract of malt, or maltine. Keep warm until the solution becomes thin. Thoroughly beat two eggs with a tablespoonful of water, then add the cooked flour, mixing thoroughly, and lastly add a pinch of salt, and inject warm for one feeding. Repeat every four hours, washing out the bowels by means of an enema of one and one half pints of warm water, adding a little salt if necessary, at least three times daily, or at every second feeding, just before the administration of the enema. J. H. K.

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EXERCISE, THE REMEDY FOR THE EVILS OF CONVENTIONAL DRESS.

BY J. H. KELLOGG, M. D.

To compare the conventional dress of women and the various mischiefs which grow out of it, to a wilderness beset with pitfalls, full of thickets, tangles, and noxious plants, pestilential miasms, poisonous serpents, and ferocious beasts, is a not unjust comparison. The woman who has become convinced of the mischiefs resulting from the ordinary style of dress worn by civilized women, particularly in the United States and England, finds in her pathway obstacles which are by no means easy to surmount, and difficulties which the inexperienced are quite at a loss to know how to overcome. It is the purpose of this brief paper to notice a few of the more serious of these obstacles and difficulties, and to point out a plain road out of the mazes of perplexity which surround the woman who has long been a slave to custom, but has become possessed of a desire to be free.

"A healthful style of dress is not becoming to me." This is one of the most common objections honestly urged by a woman who sincerely wishes to reform her mode of dress, but who finds herself met at the very threshold of her attempt by the undeniable fact that a dress made after a healthful pattern, and which "sets well," and is in every way most attractive when exhibited on another person, cannot be made even presentable when worn by herself. Evidently there is something wrong, and the fault cannot be charged to the dress, and so is often laid at the door of the dressmaker. Sometimes the poor woman, after numerous attempts and failures, becomes convinced that while a hygienic dress may be suitable for some people, it is not adapted to her figure. This conclusion is usually correct. The woman who has worn the conventional dress for a series of years, has so modified her figure that the most expert dressmaker cannot make a dress that will fit her, and at the same time conform to the principles of health and art. The conventional dress which she has worn, has been made to fit, not her figure, but a made-up figure. Upon throwing away the corset and its appendages, upon which she has depended for a form, or external skeleton, over which to drape her clothing, all the hideous deformities of figure which have resulted from corset-wearing, waist-constriction, dragging skirts, and neglect of muscular training, become at once conspicuous.

The hygienic dress primarily depends for its attractiveness upon the natural, graceful curves of the body. When these are reversed, as commonly results from waist-constriction and other evils connected with the conventional mode of dress, the result is a figure, which, without the aid of the accessories by which the fashion-makers have sought to render a conventional dress tolerable from an artistic standpoint, is, in extreme cases, positively hideous. Note, for example, the outline of the figure of a somewhat over-stout woman of fashion, as shown in Fig. 1. Imagine such a woman attempting to wear a plain, hygienic dress made to fit a woman with the form shown in Fig. 2. By the aid of artificial busts and a bustle, the woman has succeeded in making herself fairly presentable in a conventional dress; but when these appurtenances are abandoned, with the corset, the monstrous deformities of the poor body become at once and most conspicuously apparent. It is evident, then, that one of the things essential to success in the adoption of a hygienic dress, is a reasonably good figure. And it is also clear that the woman who wishes to reform her mode of dressing, must at the same time reform her figure; in other words, she must learn the art of correct carriage of the body. She must know how to stand, sit, and walk correctly and gracefully.

It has been the duty of the writer, during twenty years of medical experience, devoted chiefly to the treatment of diseases peculiar to women, to induce many hundreds of women to lay aside their corsets and all kinds of artificial supports for the trunk, as the first step toward their restoration to health. In hundreds of instances, he has been confronted by the assertion that to dispense with the corset or its equivalent, was impossible, on account of inability to sit or stand erect without its aid. The cause of this weakness is too evident to require any elaborate explanation. It is sufficient to recall the simple fact that any organ, when disused, deteriorates, becomes weak, and in time, useless. In a healthy

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human body, the several bones which form the framework of the chest and

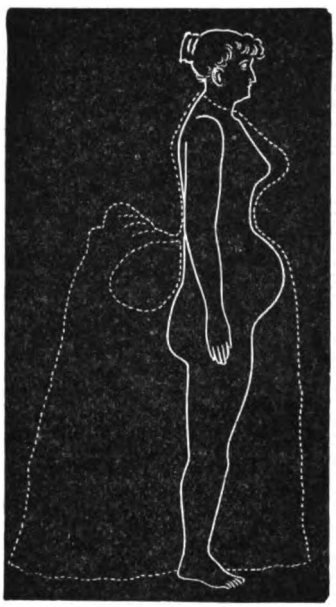

Fig. 1. An unnatural woman attempting to conceal defects.

spine, and the various organs contained within the abdominal cavity, are held together and in place by means of muscles. It is especially by the action of the abdominal muscles and the numerous muscles of the back, that the trunk is held erect, giving to man the dignity of bearing in which he is superior even to those lower animals which approach near to him in physical structure. When the trunk is supported by means of a rigid case applied to the outside of the body, and which might be termed an external skeleton, the action of these muscles is not required; the trunk is supported by mechanical means. Hence, when this support is removed, throwing the labor of supporting the weight of the head, shoulders, and viscera upon the muscles which naturally perform these functions, they are found to be so greatly weakened that an erect carriage is possible only for brief periods. The weakening of the muscles of the back and abdomen is one of the most serious injuries inflicted by the corset. This is indeed the source of a great share of the backaches, sideaches, and other nameless ills from which so many women suffer.

Other obstacles in the way of the former might be named, but these two are the most serious ones. Having mastered these difficulties, the woman who is really desirous of making a healthful change in her mode of dressing, will have no difficulty in doing so, and will not hesitate to embrace the first opportunity to shake off the fetters of conventionalism, and enjoy the right to move and breathe and exist untrammeled by the fetters of an unhealthful mode of dress. Both these evils are to be corrected by the same means, namely, the development of the muscles and the cultivation of a correct carriage. It is hoped that the following paragraphs, which are taken almost without change from a work upon physical culture which the author has now in hand, may prove helpful to some earnest woman who is really desirous of making a thoroughgoing reformation in her mode of dress, and is willing to make a reasonable effort to secure success.

First of all, the ability to stand correctly must be acquired. Among civilized people, scarcely one person in a hundred can be found who knows how to stand correctly, or who can take at once a correct standing poise, even when told how to do so.

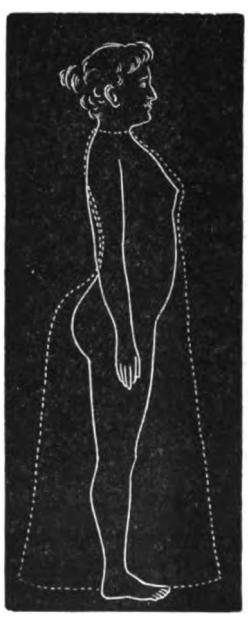

Fig. 2. A natural woman whose figure requires no appendages.

Our bodies are allowed to grow out of shape, being molded by ungraceful and

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unhealthful attitudes. The flat chests, round shoulders, crooked spines, caved-in stomachs, protruding abdomens, straight backs, awkward gait, and general lack of grace in movement, are not, as many

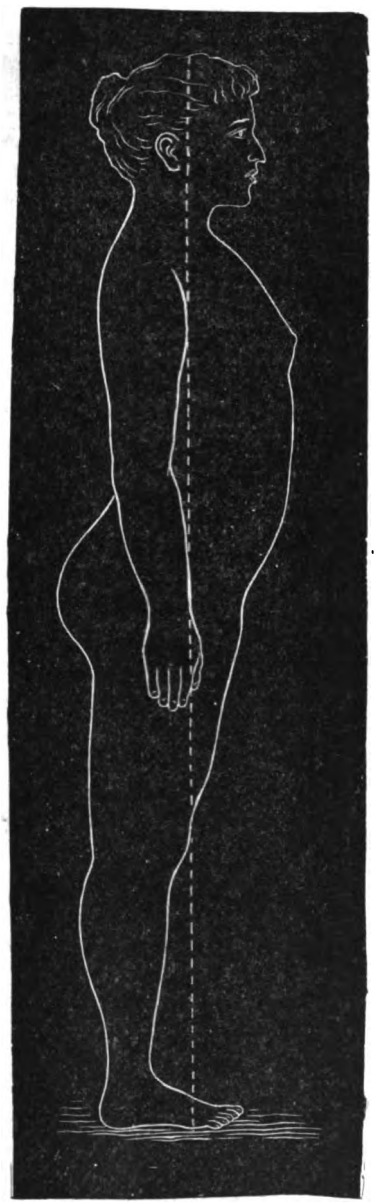

Fig. 3. A German peasant woman.

suppose, the result of inheritance or a lack of natural endowment, but the effect of wrong education, or a lack of proper education, of the body.

The exact position which a person should occupy in correct standing is shown in Fig. 3, and may be described as follows: —

1. The weight of the body should rest upon the balls of the feet, rather than upon the heels. Heel-standing is a very prevalent habit, and one which is productive of much mischief.

2. The muscles of the legs must be made firm or rigid, and the hips well set back.

3. With the hips well held back, the chest can be thrown up strongly in front. The abdomen should be at the same time well drawn in, so as to overcome the tendency to abnormal protrusion which is observable in the majority of persons who have never cultivated a correct poise.

4. The head should be held well back upon the shoulders, the chin must be slightly drawn in, and the shoulders well braced back, but not in a strained position. The arms should be allowed to hang easily at the side, and the shoulders should not be elevated.

When a person has assumed a correct poise, a vertical line passing from the top of the head just in front of the ear, lengthwise of the body, will fall at the ball of the foot. This line, it will be noticed, passes, not over the shoulder, but just in front of it.

The beginner will probably make many efforts before he succeeds in getting himself in perfect position according to the above rules. Indeed, very few persons are able to assume a perfect poise at the first attempt. A long and persevering effort is required in the majority of cases, owing to the tyranny of habit and the weakness of those muscles necessary to hold the body in correct position.

I have found the following an excellent means of enabling a person to place himself at once in a correct standing poise: —

Standing against the wall, — a door is preferable, as it has no baseboard projecting beyond the general surface, — first place the heels together, the feet at right angles, and heels touching the wall. Now bring the hips against the wall, bend the arms forward, touching the shoulders with the ends of the fingers, and press the shoulders against the wall. Carry the head backward until the back of the head also touches the wall. Now forcibly bend the head backward, keeping the heels, hips, and head in contact with the wall,

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but allowing the shoulders to advance. Keeping the trunk and legs in position, move the top of the head forward and bring the chin down, then extend the arms forcibly downward, reaching down as far as possible, and keeping the head, the trunk, and the legs in exact position.

A graceful and beautiful poise, the characteristic of health, must be maintained by a forcible effort; but by proper training of the muscles and the development of general vigor, this effort will become spontaneous, and a correct poise will be assumed unconsciously.

It is only by means of a systematic and persevering course of training that muscles long unused can be developed to their normal activity. That this can be done, however, the writer has demontrated in many scores of cases. Figs. 4 and 5 are outlines correctly representing the figure of a young woman before and after a course of treatment in the Sanitarium, and a course of training in the Sanitarium

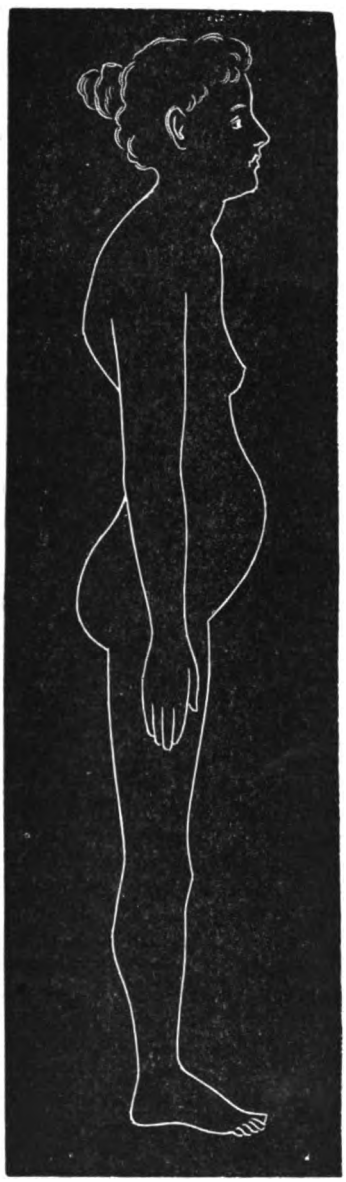

Fig. 4. Effects of corset and tight lacing.

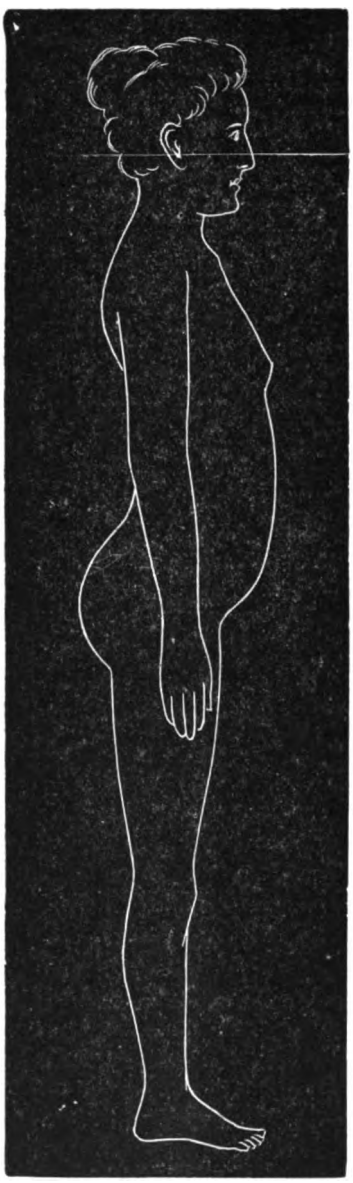

Fig. 5. The same person after training.

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gymnasium. The young woman, who had been an invalid for many years, and was in a very wretched condition with prolapsed stomach and bowels, "weak back," "weak lungs," "weak stomach," "weak nerves," and displacement of almost every organ of the abdomen and pelvis, with her improved figure acquired also good health, and has now been for several years actively engaged as a professional nurse. Hundreds of similar cases might be cited.

The gain in muscular strength and nerve vigor which may be made in a few weeks or months under judicious training in connection with proper medical treatment, which in many cases is also essential, is often truly astonishing. The writer's patients have not infrequently increased their total lifting capacity, as shown by an accurate dynamometer adapted to testing the strength of each individual group of muscles in the body, from a few hundred pounds to several thousand pounds. This cannot be done by gymnastics, athletics, Delsarte, nor by any routine system of exercise, but can be accomplished only by a judicious combination of various forms of exercise,—active, passive; with and without apparatus, based upon a precise knowledge of the individual needs of each patient.

On the accompanying chart is shown a graphic representation of the muscular strength and symmetry of a young woman before and after taking a course of treatment and training. This graphic representation of the condition of the muscular system, or "strength chart," as it is commonly termed, is made by the aid of a special apparatus for testing the strength of each particular group of muscles in the body. The results, when noted on the chart by placing points at the number found for each set of muscles, indicate at once not only the strength of each individual group of muscles and the total strength, but also the relation of the person's total strength to that of the average person of equal height, and also the strength of each group of muscles in relation to its proper strength. By connecting these points together, the representation which appears on the chart is obtained. All points below the middle line of the chart represent a degree of strength below that of the average woman for the corresponding groups of muscles. The reverse is true of all the points above the middle line. The greater the difference between the upper and lower points on the chart, the greater the lack of symmetry in the muscular development. In a perfectly symmetrical person, the points above referred to would fall upon a straight line passing from right to left across the chart. In the columns for totals at the right-hand side of the chart, the relation of the total strength of arms, legs, trunk, and chest to each other and to the entire body, is readily seen.

In the chart presented, that of a young woman aged twenty-two years, the first examination, July 14, showed a very great lack of symmetry, as well as decided weakness for a woman of her age. The second examination, November 17, shows decided gain in symmetry, and indicates that the total strength of the entire body had nearly doubled. Such an improvement indicates not simply a gain in lifting power, but a corresponding increase in nerve energy as well.

A great variety of exercises may be used as a means of development. One of the best is walking.

A few suggestions about correct walking may prove helpful. To walk well, one must be able to carry the body erect, and to balance it well while executing movements with the legs, and to some extent also with the arms. In walking, one should appreciate the fact that the whole body enters into the movement. Not only are the muscles of the legs energized, but almost every muscle of the body is brought into activity. Free movement is possible only in the legs, but an energized condition is necessary in the muscles of the trunk, in order to preserve a proper poise, while slight movements are executed by the arms synchronously with the legs, to aid in preserving the balance. The cardinal points to be observed are —

1. To maintain a correct poise, such as has been described. In walking, the tendency will be to let the body fall out of poise, either forward or backward, or to allow the momentum of the forward movement to impart to some other part of the body an undue amount of movement. In the correct walking poise, the chest and head will be carried well forward so as to keep the weight of the body balanced over the balls of the feet, when the feet are together, or at a point midway

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between the balls of the feet when one foot is in advance of the other. The hips must be carried as far back as possible without bending the trunk forward. The stride should not be long, and the heels of the advanced foot should not strike the ground much before the toes. It is impossible to walk as some trainers direct, placing the toes before the heels.

2. The whole body should be energized, the skeleton not being allowed to assume the irregular movements naturally imparted to it by the springing action of the feet in throwing the body forward.

3. The lungs must be kept well inflated while walking, taking deep, slow respirations, and expanding the chest.

4. The step should be elastic, but care should be taken to avoid a teetering or swaggering gait. A stiff, inelastic step is always fatiguing.

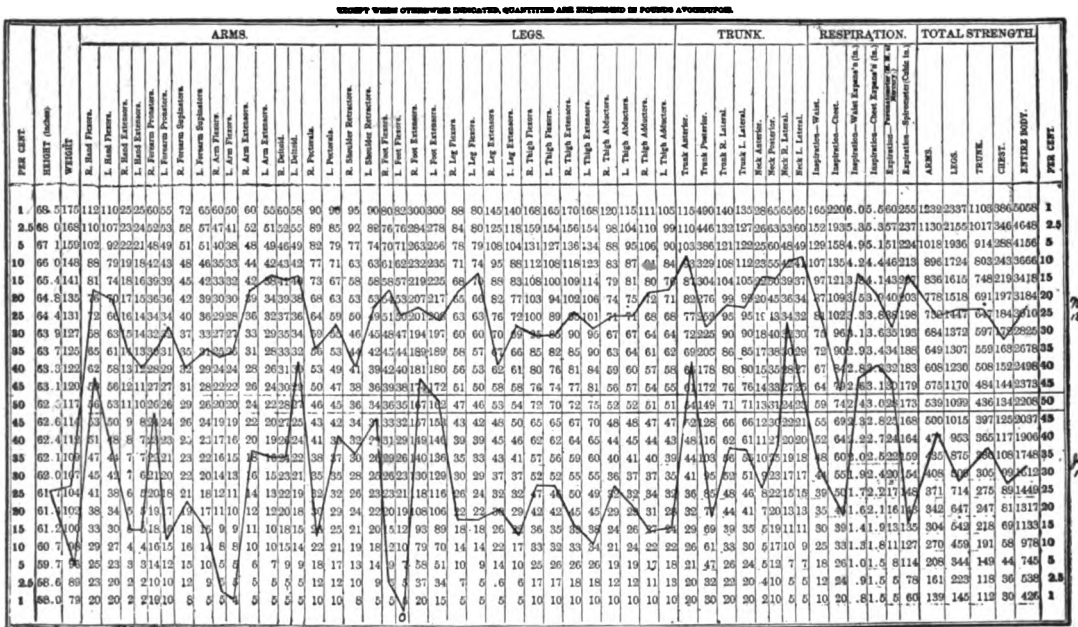
5. In walking for exercise, one should avoid a loitering or strolling gait. One often sees people upon the street taking a "constitutional," walking with a slow, measured pace, and an air which suggests a funeral procession. Such a mode of walking is exhausting rather than invigorating.

A series of walking exercises, illustrated, the faithful following of which will secure a graceful walk to any person endowed with a fair figure and ordinarily good legs, is given in the work previously referred to.

Most important of all, perhaps, for the woman whose waist has been weakened by tight lacing or the drag of heavy skirts, is the development of the muscles of the trunk, especially those of the lower back and the abdomen by means of appropriate exercises. Many women who will not confess to tight lacing, and in many instances even those who have never worn corsets, are found to be suffering from prolapse of the abdominal viscera, and a relaxed and pendulous condition of the abdominal walls, as the result of the drag of skirts upon bands, which, even when properly suspended from the shoulders, are invariably tight.

Graphic Representation of Muscular Strength & Symmetry

Arranged from the Measurements of 100 Adult WOMEN, taken and compiled under the direction of J. H. KELLOGG, M. D., Battle Creek, Mich.



The above is a representation of the improvement in strength and muscular symmetry made by a young woman as the result of four months' training and treatment.

(To be continued.)

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

TREATMENT OF HEPATIC AFFECTIONS.

BY DUJARDIN-BEAUMETZ,

Member of the Academy of Medicine, Physician to the Cochin Hospital, Paris.

Translated by J. H. Kellogg, M. D.

CONGESTIONS OF THE LIVER.

(Concluded.)

Treatment of Hepatic Congestions.—Congestion being always a secondary affection, it is important to give attention to the primary cause of the hepatic hyperæmia, of which we have two great divisions, active hyperæmia and passive hyperæmia, the latter comprising only congestions resulting from mechanical disturbance of the circulation.

For active congestions, we employ the following means: Revulsion, intestinal antisepsis, and proper dietetic regimen. At the present time, there is much discussion upon the value of revulsion, and in recent discussions upon the treatment of pleurisy, the most divergent views have been expressed respecting the utility of vesication in this disease. If the discussion had occurred upon the congestion of the liver, I believe that the greater share of physicians would have accepted its utility. For my own part, I believe strongly in revulsives in active congestion of the liver.

If you employ vesication, use two or three large blisters, but actual cautery (*pointes de feu*) is also useful in such cases. Leeches have also been advised. Our fathers made use of blood-lettings. We employ these methods very little at the present time, because of the deterioration of the blood, which often accompanies congestions.

Beside revulsion I place hydrotherapy, which is an admirable resolvent method for employment in chronic congestion of the liver. In patients suffering from malarial poisoning, with large livers, and persons who have lived in hot countries, local douches over the region of the liver produce a very favorable effect. Fleury long ago insisted upon this point, and all hydropathic means may be employed,—percussion douches, packs, and half-packs, compresses, alternating douches, the Scotch douche, etc. Great prudence and an experienced hand are required to direct hydropathic treatment. Often by too severe douches the congestion of the liver is increased instead of diminished. It is, consequently, necessary to examine the patient carefully each day, and to vary the methods of treatment according to circumstances. In revulsion and douches we have a most important means of external medication, which we can employ in hepatic congestions. To this it is necessary to add rectal irrigation.

For a long time the cold enema has been utilized in congestion of the liver. It seems to be demonstrated that this agent increases the secretion of bile, and relieves the congestion. Potain was very partial to this method.

I believe, to-day, that we can do more by adding to the cold enema an antiseptic, as for example, naphthol *a* in the dose of 3 grains to the quart, or, better, a soluble naphthol to which we have given the name of asaprol, which has been studied by my student Gacklar, which may be administered in the dose of 1 to 2 grms. (15 to 30 gr.)

In order that these enemas should produce their full effect, it is necessary to employ the method of Cantani in the administration of the entero-clyster. [I prefer the term colo-clyster for this proceedure, which consists, as I employ it, in the administration of a large enema with the patient in the knee-chest or right-Sims position.—TR.]

I employ at least a quart of liquid, which can be withdrawn after introduction by lowering the tube, as in lavage of the stomach, or the tube may be removed and the patient allowed to empty the bowels himself. In all cases of congestion of the liver related to disturbance in the functions of the large intestines, these irrigations should be employed.

Are there drugs which exert a decongestive action upon the liver? I think not, and I do not think that therapeutics affords a drug having a special elective action upon hepatic hyperæmia. But there are drugs which have a favorable action, indirect, it is true, but not less manifest, upon the active congestions of the liver. They are the alkalies, iodine, and certain substances which excite diur

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esis. The alkalies certainly favor the functions of general nutrition, and combat congestions of the liver. It is upon this fact that the favorable results obtained from the use of warm alkaline waters are based.

It should be remarked that the salts of soda appear to be particularly indicated here. The salts of lithium, on the contrary, so favorable in the uric acid diathesis in renal affections, produce no effect in hepatic disorders.

It should be well understood that it is not only the alkaline waters which are indicated in hyperæmia of the liver, but all slightly purgative waters, by relieving congestion of the intestine and of the portal system, may have a favorable action.

Iodide of potash is a valuable drug in certain hepatic congestions. Besides its action upon the circulation, it is certain that this body has some effect upon the nutrition, and it is by this double action that the happy results obtained from its use in hepatic congestions may be explained. The action of other remedies is more open to dispute. Poulet placed a high value upon hippuric acid, and employed the following syrup in hepatic hyperæmia :—

℞ Acid hippuric,..... 25 gr.
Milk of lime ....q. s. to neutralize.
Simple syrup..... ..... 500 gr.
Essence of citron or anise.....q. s.
Dose, four or five teaspoonfuls daily.

I have sometimes obtained good results from this syrup in certain cases, but I believe that it is through its action as a diuretic that the favorable influence of hippuric acid is to be explained. The same is true of boldo, which I studied some years ago with Verne. Boldo, which is highly valued, especially in South America, in the treatment of hepatic affections, acts as a diuretic, and should be placed in the same group with hippuric acid.

To all these agents it is necessary to add rigorous intestinal antisepsis by means of special medicaments and an appropriate bath. Never forget the fact that hepatic hyperæmia, by modifying the functions of the hepatic cells, destroys the antiseptic properties of these cells in such a manner that the liver no longer constitutes a living barrier opposed to the penetration into the system of the toxines produced at the surface of the intestinal tube. It is necessary, then, by means of special treatment, to reduce the toxines to a minimum. This treatment is based upon antiseptic powders on the one hand, and a vegetarian regimen on the other.

For the powders, I recommend the two following formulæ, the first administered in hyperæmias of the liver complicated with diarrhœa :—

℞ Salol, salicylate of bismuth, bicarb. soda, aa 10 grms.
M. Divide into 30 powders.

The second formula is designed for congestion of the liver accompanied with constipation, and is as follows :—

℞ Salol, benzo-naphthol, bicarbonate of soda, aa 10 gr.
M. Divide into 30 powders.

It should be understood that if the diarrhœa or the constipation is very obstinate, prepared chalk in the first formula, and magnesia in the second, may be substituted for bicarbonate of soda.

This question of diarrhœa and constipation brings me to the subject of laxatives. The role of laxatives is a very important one. The laxatives are, first, a means of eliminating the intestinal toxines. Further, the intestinal secretion which they provoke relieves the congestion of the portal vessels. Finally, their cholagogic action, by favoring the flow of bile, produces a favorable effect. We must, then, have recourse to purgative salines and cholagogues. Of the saline waters, those containing sulphate of soda are the most useful of the cholagogues; podophyllin, evonymin, and cascara and its derivatives, are the most valuable.

There is a substance which has been very highly praised as a cholagogue, and it is also a remedy for relieving congestion of the liver, viz., calomel. In England, this is the drug usually employed in the treatment of hepatic affections. I confess that I have had little experience with calomel, and that because I have always felt great timidity in its employment. It has always seemed to me that in the patients to whom I have given calomel for some time, there have appeared some phenomena of mercurial poisoning; and if calomel in the huge dose of 50 centigrams to one gram (7½ to 15 gr.), may sometimes constitute a good laxative and purgative drug in cases of constipation, in persons suffering from disordered livers, I believe that if this

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purgative action must be prolonged it is necessary to abandon this drug, and to have recourse to the laxatives of which I have spoken.

As to the vegetarian regimen, I have already dwelt so fully upon this subject that I will not repeat what I have said. The diet should consist of milk, eggs, farinaceous foods, green vegetables, and fruits. If meats are taken, gelatinous meats should be preferred to red meats, and they should be well cooked. Fish, oysters, clams, snails, game, and old cheese must be forbidden.

For bread, the patient should take bread crust. [The translator prescribes zwieback and granola.]

We have thus far been occupied with active congestions of the liver. I will now speak of the passive congestions. Here, it should be well understood that it is the heart which must receive attention. It is the feebleness of its contractions which induces, step by step, venous stasis of the liver.

The heart tonics indicated are these: digitalis, digitaline, and caffeine. Since the work of Potain and Huchard, showing that the failures which we had made arose from the employment of too small doses, we obtain very good results from the solution of crystallized digitaline in the dose of one milligram per day. The formula which I employ is the following: —

℞ Crystallized digitaline soluble in chloroform, ... .01 grm.
Alcohol ... . 9 grms.
Glycerine ..... 6 grms.
M. 60 drops of the solution represent one milligram of digitaline.

I give, three times a day, 20 drops of this solution to patients who are asystolic. It is very important that the digitaline should be soluble in chloroform. This enables us to distinguish the French digitaline from the German, as the latter is fifteen times less active than the former. You will recognize at once the importance of being well acquainted with the digitaline of which one makes use.

Strophanthus also gives good results. I employ either the French tincture, of which I give five drops twice a day, or granules of extract of strophanthus, of which I give four per day, each containing one milligram.

Finally, in certain cases of fibrous and sclerous degeneration of the heart, caffeine in subcutaneous injections is indicated.

To this treatment it is necessary to add drastic purgatives.

Finally, a non-flesh regimen must be employed. Potain goes so far as to advise, in these cases, an exclusive milk diet.

In conclusion, I wish to speak of the treatment of secondary symptoms which flow from hyperæmia of the liver, and of the treatment of hemorrhages by the application of revulsives upon the hepatic region.

Galen, before Fernel, indicated the favorable action of revulsives applied over the region of the liver, as a means of curing nosebleed. He applied the remedy over the liver if the bleeding was from the right nostril, and over the spleen if the hemorrhage was from the left nostril.

Norman, Chevers, Gubler, and particularly Monneret, also observed the frequency of nasal hemorrhages in hepatic affections, but Verneuil and his students have, in recent times especially, insisted upon this point. In a communication made in April, 1887, at the Academy of Medicine, Verneuil insisted upon the treatment of certain rebellious nosebleeds by the application of blisters over the liver, and he cited, in relation to this remedy, a great number of personal observations reaching back to 1872. Many analogous instances have since been reported, particularly by L. H. Petit and Harkin, all pointing to the conclusion that in patients affected with rebellious hemorrhages, it is necessary to examine with great care the region of the liver and the spleen, and if any disturbance is observed in these organs, to apply revulsives to these regions according to the practice of Galen.

These hemorrhages may occur from the lungs and the bowels, as well as the nasal fossæ. There are even traumatic hemorrhages which have the same origin. The energy and the direction of the revulsion must be proportioned to the intensity of the hemorrhage. If vesication is not sufficient, actual cautery should be employed. [The translator finds the application of mustard fomentations of alternate hot and cold sponging, and especially the alternate hot and cold douche to the region of the liver and the spleen, much more satisfactory than the application of blisters in these cases.]

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We have not yet reached a satisfactory explanation of the relation of hyperæmia of the liver to these hemorrhages. I have thought that functional disturbance of the hepatic cell may modify the hæmatopoietic functions of the liver, and that it may be by effecting changes in the blood that congestions of the liver favor the production of hemorrhages. This opinion has also been sustained by Harkin. Verneuil, on the contrary, thinks that it is by reflex action that revulsive applications applied to the hepatic and splenetic regions act favorably upon rebellious hemorrhages. Whatever explanation one may adopt, the fact is not less real, and should ever be kept in mind when one has to deal with persistent hemorrhages.

THE HYGIENE OF CONSUMPTION.

(Concluded.)

THE clothing of consumptives should be chosen with great care. It must be warm without being heavy, and should be of sufficient thickness, for our clothing collects, in part, the heat which is thrown off by the skin and stores it up, thereby preventing an excess of radiation when the surrounding air is at too low a temperature. It is thus necessary that the clothing worn in winter should be thick, bu the clothing should not be too light in summer, because the clothing also arrests external heat, when the air is too warm. The Arabs of Algeria and the Orient wear as thick clothing in summer as in winter. In spending the winter at Cannes, Nice, or Mentone, it is also necessary to imitate the Arabs. On the Mediterranean coast, it is necessary to always have an overcoat, a shawl, or a large tippet upon the arm, even in the finest weather, to use when one passes from sun to shade, or if a wind suddenly arises. This supplementary clothing may be spread upon the ground when one wishes to sit down. The patient should carry a broad hat or an umbrella to protect himself from the rays of the sun, the heat often causing congestion in tuberculous patients. In the South, patients should put on an overcoat or a shawl, on returning from a walk in the sun, to their apartments, the air of which is at a lower temperature.

The patient should wear flannel or light woolen garments next the skin, especially if he perspires easily in walking, for the reason that evaporation occurs much more slowly from the surface of woolen garments, and more equably than from other fabrics. The rapid evaporation of perspiration produces pulmonary congestion in consumptives, especially if they are, at the same time, in a current of cool air. The flannel vest should have complete arms; the shoulders should be carefully covered. The garment may even be made double about the shoulders, but it is absolutely useless to wear thick plasters or cat-skins upon the chest. These only increase the perspiration and the susceptibility of the patient to chilling. It is necessary to protect the limbs with drawers, and with socks or stockings of wool, covered with silk stockings. The extremities of the body, even the neck and the head, must be well protected, for they are colder than the central organs of the body. Thus, Francois Franck found, in 1880, that the temperature of the brain was .36° lower in temperature than the blood of the thorasic aorta. By surrounding the neck with a thick cravat of wool, this difference disappeared, while it was, on the contrary, increased by cooling the neck by means of a current of water passed through a double collar.

Passing in review the innumerable details necessary to constitute the hygienic treatment of pulmonary phthisis, one sees readily how difficult it is to secure the exact and mathematical carrying out of such a regimen by patients without careful supervision. In a sanitarium, the patient, isolated from his surroundings, is protected from bad advice, from discussions, and from the charlatans who cause them to swallow their panaceas and to live as they please. In such institutions, the diet, exercise, rest, clothing, ventilation, and heating of the apartments may be regulated with mathematical precision. The observation of the rules observed by other patients is an encouraging example for new arrivals, and this school of mutual education is very salutary. When I prescribe the air and rest-cure for a consumptive, I send him with his family to take some lessons from two or three patients already trained and accustomed to this mode of treatment. The good example enlightens them more than all my advice.

If all physicians would collect their

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statistics, and analyze the causes of their successes and failures, they would see that the majority of consumptives who recovered were those who were intelligent and obedient. But these two qualities are seldom united in the same patient. In a sanitarium, the authority, the positive will and conscience of the physician, take the place of these qualities. The consumptive must be under surveillance every moment, like an inexperienced and unruly child. By this means only, can he be protected from the complications due to chill, excessive fatigue, and departures from dietetic regimen. The physician who devotes himself to the treatment of consumption, if he wishes to cure his patients, must not be too amiable, seeking to please the patients or their families. He should be severe, but should know how to give proper encouragement. His prescriptions should be clear, precise, and should show that they have relation to a disease which will necessarily be prolonged, but which is curable. He must leave nothing to the patients or their parents. He must prepare for his patient a simple plan of treatment which will exclude all fatiguing pleasures; precise, employing every hour of the day; regular, permitting no departure from the regimen; agreeable, in that it requires the patient to live in the open air, prohibiting a sedentary life; encouraging, in that it will enable the patient to see the improvement resulting from the treatment ordered. He should employ all the resources of his judgment and his ingenuity to enable the patient to comprehend that outside of the rules laid down for him, his recovery is impossible. If he cannot attain this object, the only result for his patient is certain death. The same general method is applicable to the treatment of all consumptives, but the special indications vary in different cases, the details of which we present in the following *résumé*: —

1. *Treatment of a consumptive suffering from ordinary phthisis, and having had neither febrile attacks nor hemorrhage*:—

Such a patient should abandon life in town, and all occupation, should go to live in a country with a dry atmosphere, and should not engage in work. He should walk three hours daily in the open air, an hour and a half at two different times, taking care to protect the feet with rubbers when the earth is moist. The rest of the day he should rest, lying down well covered in his chamber with the windows open when the weather is clear. He should never go out after sunset. He should go to bed at 8 o'clock and rise at 8 o'clock. Every day, the body should be rubbed with alcohol or essence of turpentine. This regimen should be followed until the cough completely disappears. Then the patient should enter some profession which will enable him to live in the open air during the greater part of the day.

2. *Treatment of fibrous phthisis*: —

Revulsives every five or six days; compressed air-baths; no drugs, especially no creosote nor tannin.

3. *Treatment of a consumptive affected with ordinary phthisis; having had expectorations of blood and some febrile attacks, but, at the time, without fever*: —

Live in the country. Spend the winter in a climate similar to the south of France or Italy, and the summer in mountains between 1500 and 3500 feet altitude, and walk out only an hour in the morning and an hour in the afternoon, taking care to avoid strong winds and excessive heat. Do not undertake to climb hills or mountains, spend the greater part of the time lying out of doors well covered, protected from the wind and the sun when the temperature is not below 43° and not above 54°. When in the sun, protect the head by a thick sun umbrella. Do not sit out of doors. When not walking, lie down well covered. Wear as light clothing as is comfortable when walking, and take care to be well covered when lying down. If the patient is very liable to hemorrhages, he should seek such a climate as that of Cannes, Amelieles-Bains, Grasse, and Pisa, and should avoid Mentone, Algeria, and Cairo. Every day apply a blister over the painful points. Every day, apply a friction of the entire body, with essence of turpentine. Never dine in the city. Never go to an evening soiree or theater. Do not live a worldly life. Cease all occupation, and avoid all mental anxiety. The patient should be constantly reminded by the physician and by his tamily that the slightest imprudence or fhe slightest fatigue will provoke a relapse.

Commence progressively the use of cod-liver oil; take 1 to 8 spoonfuls with soup, daily, if possible, but renounce

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the use of this oil if it produces diarrhœa or destroys the appetite, or if it is discharged without being absorbed, replacing it by a quart of milk.

Fifteen days out of every month, take by mouth or by rectum, 30, then 40, then 60 centigrams (5–10 minims) of creosote or of gaïacol. When creosote or gaïacol are not well borne, administer 25–50 centigrams (4–8 minims) of Venice turpentine in pills, or 6 grains of tannin, or 5 milligrams ($\frac{1}{18}$th grain) of arseniate of soda, if the digestive functions are in good order. The patient must take his temperature in the axilla or the mouth twice daily,— at 8 o'clock in the morning, and at 5 o'clock in the evening. If the difference between the morning and the evening temperatures exceeds 1.4° F., or if the maximum exceeds 99.7° F., the patient should cease to walk, and call a physician to see if a relapse is beginning. The patient should weigh himself every month; and women, five days before the appearance of the menstrual period, should take, every day, 10 drops of tincture of digitalis, and 1 gram (15.4 grains) of bromide of potash, and should apply a blister to the point which is the most painful.

4. *Treatment of the consumptive at the moment of the tuberculous softening and the formation of the cavities :—*

Three times a day, evaporate in a saucepan or a vegetable dish, a coffee spoonful of the following mixture : Essence of cannell, thymol, menthol, camphor, each 1 gram. gaïacol, 2 grams; alcohol, 100 grams. Apply revulsion every ten days.

When the pulmonary lesions are in process of repair, administer phosphates, tannin, cod-liver oil, alcohol, hydrotherapy, and raw beef.

5. *Treatment of a consumptive suffering with daily fever :—*

If the consumptive has a continuous fever without remission, he should remain in bed, or lie upon an easy chair, with open windows. He should take no medicines and no revulsives. He may be allowed milk, white wine, and champagne at will. He should not move about, and should not change his residence. If the fever commences toward 10 o'clock in the morning, and disappears at 9 o'clock in the evening, he should rise from 8 to half-past 10 o'clock in the morning, but should not walk. He should take 4 grains of antifebrin at half-past 10 in the morning, at 4 o'clock in the afternoon, and at 8 o'clock in the evening. An hour after each powder of antifebrin, he should take a small meal, composed of meat, fish, or eggs, with brandy, white wine, or milk.

If the fever does not continue until after 1 o'clock P. M., and disappears at 8 o'clock in the evening, the patient should take 4 grains of antifebrin at noon, at 3 o'clock, and at 6 o'clock. He should take 7 ounces of raw meat or of meat powder at each meal; meat and fish, a little bread or other farinaceous substances; no fats. He should also take milk, brandy, and white wine. The patient may walk half an hour in the morning before mid-day breakfast. If the fever commences at 3 o'clock and disappears at 7 o'clock, the patient may walk an hour before mid-day. He should take 4 grains of antifebrin at half-past 2, and half-past 5.

If the fever is scarcely perceptible from 3 o'clock to 6 o'clock, and does not exceed 100.8° F., the patient should take a powder of antifebrin at half-past 2 o'clock, and should go to bed at 9 o'clock. He should walk an hour before mid-day, and half an hour before 2 o'clock.

These patients should place a small blister upon the painful points every ten days, and should rub the body with alcohol and essence of turpentine. They should live out of doors, lying down, or in a chamber with the window open, during the entire time, not walking to and from it. For fifteen days of every month, he should take 5 – 10 minims of creosote, or 6 – 12 grains of tannin, but the medicine should not be continued if it is not well tolerated. This patient should pass the winter in the Riviera; and the summer, in the mountains situated below three thousand feet. He should avoid Algeria and Cairo, if subject to hemorrhage.

6. *Treatment of a patient suffering from hemorrhage :—*

Silence and absolute repose. Subcutaneous injection of 1 gram (15 grains) of ergotine once or twice every 24 hours; ice to the testicles.

7. *Treatment of the diabetic consumptive :—*

Anti-diabetic diet, consisting of flesh and fat. No revulsives. Six spoonfuls of soup containing cod-liver oil, daily. Irritating frictions of the skin. If the patient has old, eczematous troubles,

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creosote or gaiacol, alternating with phosphate of lime, for the reason that diabetics lose their phosphate in the urine. The patient must be made to walk, if there is no fever.

8. *Treatment of a gouty consumptive:* —

No wine; no meats; no liquors. Walking and riding; revulsives; cod-liver oil and fat foods. Phosphate of lime, 30–45 grains daily, alternating with 3–6 milligrams ($\frac{1}{20}$th–$\frac{1}{10}$th grain) arsenite of soda daily. No creosote. No tannin.

Menthol in Pulmonary Phthisis. — Dr. Brookhouse, in an address before the Section of Pharmacology at the recent meeting of the British Medical Association, related his experience with menthol in the treatment of pulmonary consumption. His process of treatment consists in the introduction into the trachea, once or twice daily, of one dram of a twelve-per-cent solution of menthol in pure olive oil. Merck's *Bulletin* mentions this treatment, and specifies that it is done with the aid of a laryngoscope, and a syringe with a curved tube, which is introduced into the trachea about one half inch. After a little practice, the patient becomes accustomed to it, and feels no inconvenience whatever, and in some of them there arises an agreeable sense of warmth in the chest.

Rupture of an Intestine Caused by a Tapeworm. — Dr. Dunlap recently reported in the *New York Medical Journal*, a case in which rupture of the small intestine was occasioned by a tapeworm. Eight feet of the live worm were found in the abdominal cavity; seventeen feet more were removed by enema. The abdomen was opened, washed out, the rent in the intestine closed, and the patient made a good recovery.

Abscess of Lung Treated by Incision. — Huber reports a case of lung abscess detected by the exploratory needle, opened by means of a groove director attached beside the needle, the opening being enlarged by a pair of long dressing forceps. The patient made a good recovery.

Observations of Guinea-Pigs Vaccinated against Cholera with Living Vaccine. — Dr. G. Iawein, of St. Petersburg (*Annales de l'Institut Pasteur, X, page 708*) gives an interesting account of some experiments in vaccinating against Asiatic cholera in guinea-pigs by Haffkine's method with living virus. The technique briefly stated is as follows: —

The attenuated microbes are sown on the surface of coagulated gelatine in test-tubes, which are then allowed to remain twenty-four hours in the incubator at 35° C. At the expiration of this time the inoculated surface is covered with a thin coating of the comma bacillus. This layer is carefully lifted with a platinum point, and immersed in 8 c. c. of sterilized broth. The dose of injection in each guinea-pig is 1 c. c. of this emulsion. It will be seen that one eighth of the culture is thus administered in each dose, or a double dose when introducing 2 c. c. The strong virus is prepared by the same process with non-attenuated microbes.

The conclusions arrived at after these experiments are: First, the vaccinated guinea-pigs received with impunity doses of strong virus twelve or sixteen *times fatal*, the fatal dose of this virus being one twenty-fourth to one thirty-second of a tube; secondly, immunization against a mortal dose may be obtained with doses of vaccine much inferior to those adopted as normal; thirdly, immunization against a mortal dose may be obtained even by the attenuated vaccine alone; fourthly, the subcutaneous inoculation of dead microbes (killed by heat) may confer immunity as the living vaccine; fifthly, the injection of microbes in the peritoneal cavity produces marked lowering of temperature in the now vaccinated guinea-pig as well as in the vaccinated. This fact must consequently be considered as not being in direct relation to choleric intoxication, properly so called; it can be observed as well after intra-peritoneal injections of inoffensive germs, such as the bacillus subtilis, for instance. The recovery of vaccinated guinea-pigs is manifested by an elevation of temperature, but it is probable that the toxic effect of the injected microbe is neutralized a long time before this elevation occurs. Sixthly, a guinea-pig vaccinated through the peritoneum by means of a non-fatal dose of attenuated virus, insures immunity against mortal infection. P. P.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

The Detection of Tubercle Bacilli in the Sputum.— Dr. P. Kauffman, of Cairo, says Dr. Abbott, in the *International Medical Magazine*, suggests the following formula for the detection and differentiation of tubercle bacilli in ordinary methods of staining for diagnostic purposes: —

He uses boiling water, or the water at 98° or 99° C., as a decolorizer. The sputum is spread as usual on the coverglass, dried, and fixed over the flame, and then stained in warm carbol fuchsin in the ordinary manner; but instead of passing it right into acid, he passes it through hot water, leaving a rosy tinge. The bacilli retain their color about five minutes in hot water, and should not therefore, as a rule, be exposed to it any longer than three minutes, one or two usually suffices. They are then examined, or counterstained by the usual method, if desired.

Tetanus Treated with the Blood of an Immunized Animal.— The *Centralblatt für Bakteriologie* publishes a report of Tizzoni on the treatment of his fifth case of tetanus by injections of blood of animals immune from the disease. This patient presented lesions of the middle finger of the left hand contaminated with earth. The first symptoms of tetanus appeared twelve days afterward. Amputation of the finger was made at once, to prevent it from becoming a center of infection. Then they began injecting blood serum from tetanus-immune rabbits. Sixteen injections were made, varying from 2½ to 5 c.c., and a few injections of anti-tetanine separated from blood serum of rabbits. Recovery took place. The question arises here, whether or not amputation was not the real treatment that cured the disease, as such procedure has been known to cure tetanus before.

Migration of Bacteria through the Placenta of Pregnant Women in Variola.— *La Semaine Médicale* reports the result of the researches of Dr. Auche, of Bordeaux, before the Biological Society of Paris, on the above subject. He makes the statement that in two women, one three and a half months and the other two months pregnant, abortion took place in the suppurative stage of variola. In making microscopical investigation of the blood, liver, and other organs of the fœtuses, he made a pure culture of the streptococcus pyogenes in the first case, and in the second one of staphylococcus aureus. Both patients died, and the same organisms were found in each. It is not the first time such observations of microbic migrations through the placenta have been made, but it is perhaps the first report made in a case of smallpox.

Amœbic Dysentery.— Dr. Kovacs, at a meeting of the Imperial Royal Medical Society of Vienna, presented a patient suffering with what is known as amœbic dysentery, produced by the coli amœba of Loesch. The patient was about thirty-nine years of age, and became infected in Sumatra in 1879. He used to suffer eight to ten motions a day, the blood containing some mucus. The evacuations were preceded and accompanied with pain and tenesmus. He was treated for about nineteen months without success, when he went to Germany, and all the symptoms improved. The discharges, though diminished to four a day, remained marked with blood and mucus.

Dr. Kahler took charge of the case in September, 1891, when weakness was very marked, the liver and spleen were both enlarged, and the blood contained a very small percentage of hemoglobin, the number of red blood cells being 2,000,000 to the cubic millimeter. The microscopical analysis revealed numerous amœba of Loesch. Treatment has been carried on since, but a cure has not been effected. According to the writer, cases of amœbic dysentery vary greatly in their course, some being very rapid and fatal, and others being very long, with all kinds of intermediate conditions. The disease is sometimes paroxysmal in its progress. It is seldom attended with fever. Occasionally there occur hepatic abscesses as complications. Quinine by rectal injections and through the stomach has been the remedy employed mostly by Dr. Kovacs.

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NEW DISCOVERIES IN HYDROTHERAPY.

IT is astonishing, now-a-days, how frequently one encounters, in medical literature, accounts of the original discovery of the marvelously beneficial effects to be obtained from simple measures of hydrotherapy which may have been in use, perhaps, for half a century or more, but have just happened to dawn upon the consciousness of some practitioner who is not familiar with the literature of this subject. A French journal recently called attention to the great value of the hot rectal douche, or what would be more properly called, perhaps, the hot enema, as a means of relieving pelvic pain.

This new discovery is much lauded as an analgesic, and fully deserves all that is said of it in this regard, but it is by no means a novel procedure. The writer has been using the same remedy for nearly twenty years. Its value was made known to the profession by Dr. James R. Chadwick in the Transactions of the American Gynecological Society for 1880. This remedy is not only an excellent one for the relief of pelvic pain, but is of equal value in relieving the pain of renal or hepatic colic, often succeeding when morphine fails except in enormous doses.

The hot rectal douche, or hot enema, as Dr. Chadwick termed this procedure, is by no means of recent origin. An English medical authority gives an account of its use in the English army more than a century ago, as a means of reviving soldiers who fell exhausted on a march or in battle. The warm enema is often debilitating and relaxing, but a hot enema taken at a temperature of 108° to 110°, is of high value as a means of rallying a patient from exhaustion or from the effects of shock.

A German authority recently called attention to the value of hot and cold applications to the spine, as a means of stimulating into activity the central nervous system. This also is a procedure quite too ancient to be considered a new discovery. It must be now nearly twenty years since Dr. Chapman, of London, first called attention to the value of the application of hot and cold to the spine as a means of affecting the central portions of the nervous system. Dr. Chapman's hot water bags and ice bags are at the present day almost universally employed. There is no internal stimulant that can be administered with safety which will act so effectively as alternate hot and cold sponging of the spine, or alternate sponging with hot water and rubbing with ice, changing the application every few seconds. The writer has seen patients who were comatose from opium poisoning, rally after a few minutes by this procedure. It is also a most powerful means of stimulating the spine and basal brain in cases of neurasthenia, in which it is important to arouse the dormant nerve centers to activity.

The German "umschlag," or moist abdominal girdle, is another measure, the value of which seems to be just beginning to be appreciated in this country. There is no other simple measure with which we are acquainted which is so useful as this in overcoming insomnia. A large fomentation over the stomach and bowels at bedtime, followed by the application of a towel wrung dry out of cold water and applied about the trunk, then covered with several thicknesses of dry flannel, and lastly with oiled muslin

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or some impervious fabric, so as to retain heat, will secure sleep in many cases in which hypnotics fail. J. H. K.

DEATH IN THE WELL.

It was once the fashion to ascribe all cases of sickness and death, from causes not readily discernible, to special acts of Providence; it is now, however, well recognized that sickness is the result of the action of natural laws and of material causes, which, in the great majority of cases, as regards acute illness at any rate, are preventable.

At a recent meeting of the Michigan State Board of Health, Prof. Fall, of Albion, Mich., called attention to one mode in which what in times past might be termed strange dispensations of Providence, are being very effectually produced in the southern part of this State. According to Prof. Fall, it is quite a prevailing custom to secure the drainage of cesspools, and other receptacles of filthy water, by boring down through the underlying strata of clay or rock until an under ground watercourse is reached, by this means securing permanent and very satisfactory drainage. The objection to this plan, however, is to be found in the fact, which, it would seem, ought to be readily recognized, that this is the most effective manner possible of contaminating the water supply for an extensive district. It may be supposed that at the present time every intelligent person knows enough about sanitary matters to understand perfectly well the danger of the contamination of wells which are fed by surface drainage; but driven or bored wells, which penetrate an impervious strata of rock or clay, are generally supposed to be a safe and reliable source of water supply. This new device for the disposal of filthy water, is, however, a most efficient method of contaminating the underground water supply, and spreading disease and death to an unknown distance through the conveyance of infectious matter by these underground currents to distant parts. Dr. Baker called attention to the fact that the water supply of Jacksonville, Fla., is supposed to come through an underground water-course from the adjoining State of Georgia. Numerous cases are on record in which disease germs have been carried for many miles in these underground water-courses.

The writer became acquainted with a case several years ago, in which a man disposed of a great accumulation of barnyard litter by throwing it into a well for which he had no further use, on account of having recently had constructed a bored well of great depth. Within a short time afterward a neighbor, who lived across the road, and in the direction of the dip of the surface and of the underlying strata, discovered that something was the matter with his well; complaint was made to the health officer, who submitted a sample to the writer for examination. The water was found to be full of organic impurities and swarming with germs, and had a decided barnyard odor, showing clearly the origin of the impurities.

Unthinking people may suppose that filth which disappears from the surface of the earth goes out of existence, but this is by no means the case; germs possess great vitality, and may be conveyed bodily in water-courses for a very great distance. When it is allowed to percolate through the soil, impure water is gradually purified by a process of nitrification, although the soil may in time become so saturated with filth that its properties for purification may be exhausted; but when filth passes directly by bored channels into the underground water-courses, there is no bar whatever against the wide dissemination of the agents of disease and death which are always to be found in impure water.

J. H. K.

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Movable Kidney and Dilatation of the Stomach.— The *British Medical Journal* summarizes the following interesting facts presented by Krez in a recent article relating to enteroptosis, particularly the frequent association of movable kidney and dilatation of the stomach : —

"Krez refers to Bartel's view with regard to the occurrence together of movable kidney and dilatation of the stomach. If owing to tight lacing the kidney is pushed down, the descending portion of the duodenum may be pressed upon and the outflow from the stomach made difficult. In one case recorded by Heller, the duodenum was actually found to be dilated. Glénard was the first to point to prolapse of the various organs as a cause of nervous dyspepsia. The hepatic flexure of the colon, the transverse colon, and the stomach, sink in position. It is said that entero-stenosis may thus arise, and that by prolapse of the duodenum a sinking may take place. The frequent displacement of the kidney is only one link in the chain of these displaced organs, and prolapse of the uterus completes the condition. The diagnosis of enteroptosis is made by pressure on the hypogastrium upward and inward, when the symptoms are relieved.

"The author relates the case of a woman whose symptoms were referred to enteroptosis, and who died subsequently of tuberculosis. The stomach was dilated and displaced downward, and the transverse colon was situated three fingers' breadth below the navel. The hepatic flexure was on a level with the crista ilii. Both kidneys, especially the right, were displaced. The right kidney could be brought forward toward the navel and put back into its place. The liver showed a constriction, and was adherent to the diaphragm. The spleen was unaffected. The duodenum was not dilated. The displacement of these organs in the sense used by Glénard, is not to be doubted. The author refers to five cases of enteroptosis, and analyzes the symptoms present. He believes that the whole process is begun by the sinking of the hepatic flexure of the colon, as this has the loosest connections with the posterior abdominal wall. Of the causes of enteroptosis, child-bearing is the most important; but others, such as tight lacing, rapid disappearance of fat, riding, dancing, etc., must be taken into account. The author refers also to hereditary predisposition. The treatment is chiefly by the hypogastric belt."

We have made more than one thousand examinations in which the relation of kidney and stomach, as well as of the other abdominal viscera, was carefully noted, and we find the views of Bartel and Glénard amply sustained. We cannot agree, however, with Krez, that the hypogastric belt constitutes the chief treatment for this condition. A mechanical support is only a palliative. The proper treatment of enteroptosis consists in restoration of the prolapsed organs to their proper position by skillful massage and the development of the abdominal muscles by massage, medical gymnastics, and the proper application of electricity.

J. H. K.

The Influence of Light upon the Skin.—Hammer, an Italian investigator, has made some very interesting observations respecting the effects of light upon the skin, as reported in the *Rif. Med.* The results of these observations may be summarized as follows : —

1. Light increases the excretions of CO_2 by the skin, and thus favors healthy growth.

2. Light increases the development of pigment and horny growths on the skin.

3. White light, as well as different colors, is capable of producing sensation in the skin, the action being probably analogous to that upon the retina.

4. Erythema due to exposure to the sun's rays, is the result of the action of

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the ultra-violet rays of the spectrum, a stimulus to which the skin is unaccustomed.

5. The effect of heat without light is absolutely different from that of light alone.

6. Electric light is a powerful excitant of the skin on account of its richness in ultra-violet rays.

7. Solar erythema may be prevented by protecting the skin with material or preparations which intercept the ultra-violet rays.

8. Various morbid products are formed in disease, which, under the influence of light, will give rise to cutaneous symptoms.

Bad Medical Advice.— We are sorry to find, in one of our exchanges, a formula which is recommended as "a preventive against gonorrhœa." Some years ago, a professor in one of our large eastern medical schools was in the habit of occupying a portion of the opening hour of his course of lectures with instructions to the young men as to the best means of protecting themselves from the contraction of venereal diseases. His recommendations did not relate to the protection of the hands or other portions of the body which are in danger of exposure through professional contact with patients, but were of such a nature that the professor thought it necessary to apologize for his remarks by the suggestion that he knew they would indulge in gayeties which would involve exposures, and hence desired to put them in a position at the outset, of such information as would protect them from any injurious consequences.

So long as the medical profession themselves occupy such an attitude as this in relation to diseases arising from immorality, social purity and other reform associations will make little headway in the reformation of the morals of our fast degenerating society. The young men of the rising generation need no encouragement in the direction of sexual immorality. The writer has not infrequently been consulted by young men who had been led into immorality by the advice of physicians by whom they had been told that a life of continence was injurious to them, and that moderate sexual indulgence was necessary for their health, or required as a means of cure. In not a single instance had anything but disaster resulted from following this advice. In three cases, young men had contracted syphilis as the result of the course to which they had been advised. All had previously been young men of irreproachable character, and it is needless to say that all bitterly repented following the advice which had been given them. We are gratified to note, in a recent number of the *Medical Age*, an excellent editorial from which we quote with our most hearty endorsement, the following paragraphs: —

"A fact we wish to insist upon is, that sexual continence does not beget impotence, and that the all-prevailing cause of impotence is prolonged sexual excess. In support of the opposite conclusion, appeal has been made to analogy. It has been pointed out that unused muscles and bones waste, and therefore, it is urged, it must be true that continence will lead to impotence. Such argument is utterly fallacious, as are most arguments from analogy. Facts in abundance prove the contrary. Common as is sexual vice, continence is not unknown among us, and the truth of our statement is not difficult to verify. The real argument from analogy is drawn from the breast. This gland is generally inactive for many years after puberty, and yet whenever the call for its activity arrives, it is more or less perfectly responded to. As a matter of fact, impotence does not depend upon the testicle, but upon the spinal cord; the sexual act is a physiological nerve storm, and not simply an act of secretion.

"No function of the body is so influ-

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enced and controlled by the higher nerve centers as the sexual. It is excited by lewd imaginings, loose talk, and sensuous scenes. It is set in motion by even accidental stimulus of any part of the nervous system affected by the sexual organism. Hence the difficulty of continence. On all sides are sights and sounds that may become the stimulus of sexual excitement. The other side of the picture is equally true. By the exercise of watchfulness and self-control, the occasions of such excitement may be reduced to a minimum and the passion may be subdued. Medical men are sometimes asked to formulate rules of diet and exercise — hygienic rules — by which immorality is to be banished. The task is impracticable. Vice is voluntary, and it is only by the exercise of a resolute self-will that virtue is maintained." J. H. K.

Raw Beef Steaks.— Popoff's researches on the digestibility of beef and fish prepared upon different methods, show very conclusively that both these comestibles are much more digestible in their raw state than when cooked. According to his observations, the longer the beef is cooked the more indigestible it becomes, and contrary to generally prevalent ideas, beef is, in all cases, more digestible than fish, except in case of smoked beef. The superior digestibility of raw meat has long been recognized by physicians in the feeding to invalids with weak digestion, meat pulp, beef juice, and other preparations of raw meat. The question now arises, Shall the cooking of meat be abandoned?

In the light of these physiological researches, it would seem that the cooking of meat is an ancient error into which the human family have fallen, and that if we are to use flesh as an article of food, we ought to return to the primitive habit of eating it raw, like a native of Terra del Fuego or a Kalmuck Tartar. The danger of contamination by disease germs or infection by trichinæ, the embryos of tapeworm, and other parasites, stares us in the face, however, and hence there seem to be left but two alternatives: either to take our beef steaks as heretofore, well done, or to become vegetarians. Vegetarianism seems to be growing in favor; less, however, through the agitation of the advocates of man's return to his primitive diet, than as the result of the constant revelations made by those engaged in pathological and bacteriological researches respecting the numerous evils which arise from the free use of flesh, and the dangers of contamination which threaten meat-eaters from a hundred different sources. J. H. K.

Electrical Quacks at the World's Fair.— We are glad to see that the electrical quacks are having a hard time with the managers of the World's Fair. Prof. Peabody, the head of the department of Liberal Arts and Manufactures, is a man of wide learning, great information, sagacity, and rare good sense. He has been beset on every hand by charlatans of every description who have been determined to make a representation of their wares in this department. Failing in their designs, the manufacturers of electrical belts, pads, and other similar humbugs, appealed to the managers of the electrical department, but, we are glad to say, with equal ill success. The public will probably not appreciate the obligations which they are under to the men who have stood sternly against the tremendous pressure which has been brought to bear upon them to ignore the dictates of reason and principle in this matter, but the medical profession certainly will, and do appreciate this intelligent action on the part of laymen. J. H. K.

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REVIEWS.

Hand-Book of Obstetrical Nursing. — By Annie M. Fullerton, M. D. P. Blackiston, Son & Co., Phila., pub.

The publishing house by whom this work is issued, seem to have a happy faculty of finding just the right parties to prepare a work on any given subject which they recognize as requiring a new or more lucid representation in medical literature. They certainly have been fortunate in securing the services of Dr. Fullerton, the able physician, obstetrician, and gynecologist in the Woman's Hospital of Philadelphia. The volume is an excellent one, and presents just the technical knowledge required by the obstetrical nurse who wishes to give to her patients all the advantages of modern aseptic and antiseptic care. Every trained nurse should be provided with a copy of this work, and make herself familiar with its contents. It will doubtless be largely used as a text-book in the nurses' training schools of the country.

Gould's Pocket Medical Dictionary. — P. Blackiston, Son & Co., Phila. This little volume contains 12,000 medical words, which are briefly but clearly and concisely defined, and have the pronunciation correctly indicated. It is beautifully bound in Morocco, gilt edges, and is of a size convenient for carrying in the pocket. It will doubtless prove a greater boon to medical students than the larger dictionaries, as it may be always at hand ready for use. A copy ought to be in the coat pocket of every medical student in the country.

A Compend of Human Anatomy. — By Sol. Potter, M. A., M. D. Published by P. Blackiston, Son & Co., Philadelphia. This is the fifth edition of a little work first published only six years ago, and the success of which is indicated by the rapidity with which new editions have been called for. It is just the thing for the earnest student of anatomy, giving in clear, concise language a very complete summary of the anatomical facts which the student should have thoroughly impressed upon his memory. One of the most useful features of the work is an appendix containing a series of plates and tables, classifying and illustrating the arterial and nervous system.

The Action of Alcohol on Animal Heat Functions. — By Edward T. Reichert, M. D., Philadelphia. This paper is unquestionably one of the most important contributions to the scientific study of the effects of alcohol upon the human body, which has recently been made. The general results, which will be more thoroughly stated elsewhere in these columns, were to demonstrate that alcohol uniformly increases heat dissipation, and almost uniformly, thirteen out of eighteen, diminishes heat production. In this respect it differs from most other agencies which increase heat dissipation, the general rule being that such agencies at the same time increase heat production. The value and importance of these observations will be readily recognized.

The National Medical Review. — By C. H. Stowell, M. D., editor and publisher, Washington, D. C. This journal is what its title indicates, a *medical review*. It is one of the brightest and most readable journals that comes to our table. Every page has something sparkling on it from the pen of the editor, who puts himself into his journal in a way which indicates that he loves his work and knows how to do it. Each number of the journal contains a new installment of "Letters to a Young Physician," which contain a fund of good advice that it would be well if every young physician could read and heed.

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THE LABORATORY OF HYGIENE.

(SANITARIUM.)

J. H. KELLOGG, M. D., SUPERINTENDENT.

MONTHLY BULLETIN.

BATTLE CREEK, MICH., MAY, 1893.

OBSERVATIONS WITH REFERENCE TO THE VALUE OF METHYL-VIOLET AS AN INDICATOR OF THE PRESENCE OF FREE HYDROCHLORIC ACID.

THE general use of methyl-violet in the colorometric method of studying stomach fluids with reference to the presence or amount of free hydrochloric acid, renders important a precise estimate of the value of this color reagent. Within the last six months, the relation of this reagent to the amount of free hydrochloric acid present in the stomach liquids, has been comparatively studied by the writer in more than 600 different stomach fluids. In a few of these, the data observed were not quite complete, so that they were thrown out, leaving 567 cases to which the statements made in this article refer. Of these 567 cases, free HCl was indicated as absent in 86 (15 per cent), and present in very small quantity in 57 (9.9 per cent). The reaction was decidedly marked in 325 (56.4 per cent) cases, and was very marked, indicating excess of HCl, in 108 (18.7 per cent) cases. In each case in which the color reagent was used, a careful quantitative analysis was also made, in which the total chlorine was determined as well as the amount of chlorine in the form of free HCl. Quantitative analysis showed free HCl to be absent in only 8.6 per cent of the cases,—a trifle more than one half the number of cases in which the color reagent indicated it to be absent. The quantitative estimation indicated HCl in excess, that is, in a quantity greater than 50 milligrammes of anhydrous HCl in 100 c. c. of stomach fluid, in 146 cases, or 25.3 per cent.

These figures indicate sufficiently the inaccuracy of methyl-violet as an indicator of either the absence or the relative amount of free HCl present, since free HCl was present in nearly one half the cases in which it was indicated to be absent by methyl-violet, and the reagent failed to indicate excess in nearly as large a proportion of the cases in which decided excess existed. But a careful study of the cases in which free HCl was indicated to be absent or in excess, in comparison with cases in which the actual facts were determined by quantitative analysis, shows a most astonishing lack of coincidence; for example, of the 86 cases in which methyl-violet indicated the absence of free HCl, the acid was found present in 54, or 62.9 per cent, of the cases. In a majority of the cases in which free HCl was present, although indicated to be absent by methyl-violet, it was present in a quantity of from 4 to 8 milligrammes for each 100 c. c. of stomach liquid. In ten cases the amount of free hydrochloric acid reached from 16 to 18 milligrammes per 100 c. c. of stomach fluid; in one, 36 milligrammes; and in another, 40 milligrammes. The average of 18 cases was nearly .018 grammes, a close approach to the normal amount. Certainly, from the pathological indication in these 18 cases, positive damage might have been done by the administration of hydrochloric acid, al-

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though the methyl-violet test indicated the necessity for the use of this drug.

The results of the comparison were equally bad in cases in which an excess of free HCl was indicated by the methyl-violet test. Of 108 cases in which the color reaction was very strongly marked, quantitative analysis showed excess, that is, more than 50 milligrammes in 100 c. c. of stomach fluid, in only 6 cases (5.5 per cent), while free HCl was totally absent in 8 cases.

It is thus apparent that as an indicator of excess, the methyl-violet reagent fails much more frequently than it succeeds, and hence, if used at all, should be interpreted negatively, the failures being 7.4 per cent of the cases, or one third more frequent than the successes. A study of all the cases showed that free HCl was absent in 21 cases in which methyl-violet showed it to be present. Of these, acid fermentation was present to a very marked degree in 8 cases. The reaction for lactic acid was distinctly marked in 9 additional cases, and in the remaining 4 cases in which neither fermentation nor lactic acid was indicated as present, there was a great abundance of peptone. As lactic acid is almost invariably present in connection with fermentation in the stomach, it is probable that this is at least one of the substances which interfere with the color reaction of methyl-violet as an indicator of free HCl.

The above facts seem to indicate beyond controversy the unreliable character of methyl-violet as a color indicator, and to condemn its use as a reagent in the examination of stomach fluids. Günzburg's reagent, and the resorcine reagent of Boas, are much more reliable, and, as a rule, may be depended upon as indicators of the presence of free HCl.

The reason why Ewald finds so many cases in which free hydrochloric acid is absent, is to be found in the explanation which he himself gives in explaining another anomalous fact, which he says is "due to the incompleteness and coarseness of our present methods." This explains another fact mentioned by the translator of Ewald's work, Dr. Morris Manges, namely, "the surprising number of such cases recently reported in the various medical journals without correspondent constitutional symptoms." "Such cases" refers to cases in which a diagnosis of atrophy of the stomach has been made.

In the study of 700 stomach fluids by the exact methods of determining quantitatively the amount of free hydrochloric acid present in the gastric juice, devised more than half a century ago by the eminent Prof. Golding Bird, of Guy's Hospital, London, Eng., and recently perfected by Hayem and Winter, of Paris, I have found free hydrochloric acid absent in only 52 instances, and in not a single instance has free hydrochloric acid been found to be absent without very distinct evidence of ill health, in disordered digestion.

Examinations of stomach fluid have frequently been made in women during the menstrual period, but in no instance has free hydrochloric acid been found absent. The reason for these numerous errors in observation, which are so misleading in diagnosis, is to be found in the unreliability of the color-tests for free hydrochloric acid, especially the methyl-violet test, which, as already shown, not infrequently fails to indicate the presence of free HCl, although it may be present in a considerable quantity in the fluid examined.

Physicians have frequently found themselves in disgrace from basing a diagnosis of atrophy or cancer of the stomach upon the absence of free HCl, as indicated by methyl-violet, and have thereby been led to discredit the value of all chemical methods of investigating stomach disorders. It is safe to say that the colorometric methods are wholly unreliable, except as giving suggestive indica-

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tions, which in a majority of cases are of some value, although not infrequently the indication given is the opposite of the truth.

I shall give, at some future time, a more complete account of my investigations in this direction.

GRAPHIC STUDIES OF THE SINUSOIDAL AND OTHER FORMS OF ELECTRICAL CURRENTS.

(Continued from January No.)

THE motor effects are obtained by running the apparatus at a slow rate of speed; that is, a speed giving alternations of the current varying between 50 and 150 per second.

Sensory Effects.— The sensory effects are obtained by running the machine at a high rate of speed, securing alternations of 100 to 200 per second. The effect of the current upon the sensory nerves is equally remarkable. With sponge electrodes applied to the temples, the machine being run at a high rate of speed and the current controlled by a rheostat, a most remarkable display of light impressions is observed in the vicinity of each pole, the impression being that of moving circles concentrically arranged. The appearance might be not inappropriately compared to a great whirlpool of light. Absolutely no other sensation is perceived with a current of moderate intensity. As the intensity of the current is increased by the adjustment of the rheostat, the display of light increases to a marvelous extent, and finally a light prickling sensation is experienced in the skin, which becomes painful and is accompanied by tonic contraction of the underlying muscles, if a certain strength of current, variable with each individual, is exceeded. I am studying the effect of the current upon the various divisions of the tactile sense, the sense of taste, the olfactory sense, and the auditory sense, but am not yet prepared to publish my results. The peculiar effects of the current upon the optic nerve I attribute to its remarkable power of diffusion or penetration.

I have found the current of very great service in connection with the application of large currents for the electrolytic treatment of uterine fibroids, as it greatly lessens the pain of the application, and thus enables the patient to tolerate a current of considerable greater strength than could otherwise be borne. When used for this purpose, an additional electrode is placed upon the back, to which one reopore is attached, the other being connected with the intra-uterine electrode. If after the galvanic current has been made as great as the patient can endure, the magnetic current is turned on, the patient is at once relieved, and the galvanic current may then be increased, usually from 20 to 30 milliamperes. Even when the galvanic current has been increased to such an extent as to lead the patient to beg to have it reduced, the pain usually ceases almost instantly when the sinusoidal current is switched on.

As an analgesic, and for the relief of various illy defined sensations to which persons refer under the general term "pain," I know of no mode of electrical application so valuable as the sinusoidal current obtained from the machine when moving very rapidly, the dose, of course, being regulated by means of a suitable rheostat.

In a case recently under observation, — a patient who had suffered for several years from a peculiar sensation of emptiness in the head, and what she termed a loss of the sense of time, doubtless using this mode of expression for want of a better means of expressing her feelings,— complete and permanent relief was obtained by two or three applications. Many patients who seem to have an utter intolerance of any other form of electrical current, are benefited by the application of this current. Indeed, I have never found a case in which any unpleasant effects were produced by it.

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The fact that such profound motor and sensory effects can be produced without the ordinary shocking, prickling, and other sensations, is a grateful surprise to the patient, and certainly enhances its value as a therapeutic means.

I have found no electrical application so valuable as a means of relieving a hyperæsthetic condition of the abdominal sympathetic ganglia, especially the semilunary ganglia, the lumbar ganglia, and the lumbo-aortic plexus of the sympathetic. It is equally efficacious in relieving pains beneath the shoulder blade and in the back, which are often erroneously attributed by patients to a diseased liver, but which are due, in a great majority of cases, to a congested and irritated condition of the abdominal sympathetic ganglia.

A rapidly alternating sinusoidal current is one of the most efficacious means with which I am acquainted for the relief of the peculiar sensation known as "heaviness," of which dyspeptic patients often complain. This sensation is due to a perverted condition of the sensory nerves of the stomach. Its relief by a rapidly interrupted current is an evidence of the penetrating power of this current.

The rapidly interrupted current may be applied to the stomach either externally by means of a flat sponge electrode, one over the stomach and the other over the spine opposite, or internally by means of a properly formed electrode placed inside a stomach tube, with a flat sponge electrode either over the stomach or the spine opposite the stomach. I have applied the sinusoidal current in this manner in a large number of cases for the relief of stomach symptoms, especially in cases in which examination of the stomach fluid by the method of quantitative analysis, which I have elsewhere described, showed deficiency in that form of stomach work which consists in the combination of free chlorine with albumen, as shown by the diminished amount of the combined albumen.

(To be continued.)

THE EFFECTS OF CONDIMENTS UPON STOMACH DIGESTION.

At the present time a series of very interesting experiments is being conducted in the laboratory, the purpose of which is to determine the effects of condiments upon peptic digestion. Five healthy young men whose stomach formulæ have been determined by means of the standard test breakfast, have been made to take in various quantities, with the test breakfast, black pepper, red pepper, pepper sauce, mustard, and other like substances, and the results upon the chemical processes of the stomach have been carefully noted. A very constant and characteristic effect has been observed in the increase of a certain element of the stomach work, but a notable decrease in another direction. The diminution of stomach work, as will be shown in a more detailed account of these experiments which will be given in a future number, is in the useful work of the stomach, by which the chlorine is made to combine with the albumen; in other words, although condiments of various sorts have the effect to increase the amount of free hydrochloric acid in the gastric juice, and the amount of chlorine liberated from the fixed chlorides, the amount of chlorine which enters into the useful stomach work of digestion is notably diminished.

This method of investigating the effects of various substances upon digestion is one which affords an opportunity for the most useful and extended studies in practical dietetics. A large number of observations of various sorts have already been made in the laboratory, and we hope to be able to give at an early date an extended account of the important data collected, some of which are exceedingly interesting from a practical standpoint as well as from scientific and theoretical considerations.

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MODERN MEDICINE
AND
BACTERIOLOGICAL WORLD.

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ORIGINAL ARTICLES.

REPORT OF THREE CASES OF MULTIPLE NEURITIS.

BY W. H. RILEY, M. D.
Sanitarium, Battle Creek, Mich.

IT has only been during the past few years that the symptoms of the above-named disease have been correctly recognized and diagnosticated, even by neurologists. The symptoms presented had been for many years classified under the heads of "Alcoholic Paralysis," "General Spinal Paralysis," "Locomotor Ataxia," and others; and at the present time in general practice, multiple neuritis is frequently mistaken for some form of spinal trouble, or a very vague and indefinite idea is entertained as to the real nature of the disease, and the correct methods of its treatment. The following three cases are reported,—

1. For the purpose of briefly directing attention to some of the prominent symptoms and the course of the above disease.

2. To illustrate successful methods of treatment.

CASE I.

Mr. A., aged 33 years, an American by birth, a laborer by occupation, came to the Sanitarium for treatment of "paralysis of the upper and lower extremities," and gave the following history: —

With the exception of slight ailments, the patient had always enjoyed good health up to the beginning of the present trouble. The disease with which he is now suffering began about ten weeks ago, by persistent vomiting, attended with nausea, which continued at short intervals for twenty-four hours. At this time he had a very sore throat, and was obliged to take his bed for one week, with a temperature of 100° to 101° F. While in bed, his throat continued sore. At the end of one week he was able to be up, but in attempting to walk, noticed a "weakness in the knees." He would tire on the slightest exertion, and walking was an effort. He had a sensation as though the cords and muscles of the legs were getting too short. At times he suffered from a numbness, and burning and aching pains in the feet, which later traveled up the legs. Simultaneously with these symptoms in the feet and legs, were similar manifestations of the disease in the upper extremities. There was a numbness and soreness in the fingers and hands. The fingers felt thick and clumsy, and a weakness, which showed itself most prominently in performing some delicate movement, such as writing or buttoning the clothing, was present. These symptoms continued and grew worse. The patient became weaker, and tired more easily on the slightest exertion. Walking was difficult, and his movements were all weak, incoördinated, and ataxic. At the end of a month the weakness was so great that he could walk no longer, and was obliged once more to take his bed. The pain continued, and increased in severity. The patient remained helpless in bed for several weeks, part of which time he could not move toes or feet. Finally he came to the Sanitarium for treatment, about ten weeks from the beginning of his trouble, and his condition on entrance is indicated in the report of —

EXAMINATION.

The patient is a man of medium stature; height, five feet and seven inches; weight, 125 lbs.; thin in flesh; digestion somewhat impaired, bowels constipated; action of the heart somewhat weak; pulse 100, sitting; temperature normal. Other organs of the body are normal, except as indicated below.

Motor Symptoms.— By the aid of support he can barely take a few steps at a

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time. In attempting to walk, he broadens his base, staggers in his path, and keeps his eyes closely fixed on his movements. All his movements are weak and slow. He can only flex the ankles and extend the toes to the slightest degree in both feet. The paralysis of the muscles of the front of the leg, allow the foot to drop and the toes to scrape on the floor in an attempt to walk. He partially overcomes this difficulty by increased flexion of the thighs, which raises the foot and frees the toes from the floor.

Paralysis of the small muscles of the foot, especially the interossei, and the extreme weakness of the flexors of the ankles, together with the unopposed action of antagonistic muscles, has developed a deformed shape in the foot, which

Fig. 1. Shape of Foot in Case 1, of Multiple Neuritis. Paralysis of flexors of ankle and interossei muscles of foot, adductor and short flexors of great toe.

is illustrated in Fig. 1. In this figure it will be noticed that the foot is extended at the ankle, the arch of the foot is increased above, and the hollow of the sole of the foot is increased below. The four smaller toes are extended at the first joint, and flexed at the others. The adductor and short flexor of the great toe are also paralyzed, which allows it to take a somewhat different position than the other toes.

There is also a decided weakness in the upper extremities, but in a less degree than in the lower. This weakness is general, and affects all their movements. In the flexors, pronators, and supinators of the hands, and the flexors and extensors of the fingers, and in many of the smaller muscles of the hands, the paralysis is nearly complete. Many delicate movements, such as writing or buttoning the clothing, cannot be performed at all, or they are done with the greatest difficulty. A careful test of the strength of the muscles in the upper and lower extremities with a mercurial dynamometer, shows their weakness even more conspicuously than in the ordinary movements. Such a test develops the fact that the weakness is greater in the muscles below the knee in the lower limbs, and below the elbow in the upper limbs. The symptoms are all most prominent in the extreme distal end of the upper and lower extremities. There is present in the limbs a twitching and jerking of muscular fibers, and sometimes of a bundle of muscular fibers. The knee jerk is absent in both legs. The plantar skin reflex is absent. Cremasteric and abdominal skin reflexes are present. The patient can stand but for a moment with his eyes open; he cannot stand or walk at all with his eyes closed. The electrical reaction of the muscles of the legs is decidedly diminished to both faradic and galvanic currents.

Sensory Symptoms.— The sensory symptoms are quite as prominent as the motor symptoms. The patient suffers from dull, aching pains in the legs and arms, sometimes has sharp, shooting pains in the legs, resembling somewhat the pain of locomotor ataxia. The muscles of the legs, thighs, and forearms are sore and tender to pressure, and there is tenderness along the course of the affected nerves. He also complains of numbness, "deadness," and burning in the hands and feet.

In standing, or attempting to walk, he cannot tell from any sensation in his feet whether he is on a bare floor or a carpet. Anæsthesia is more or less complete in certain parts of the upper and lower extremities.

The disease has in this case selected certain branches of the nerves distributed to the skin of the extremities, so that by careful examination, areas where there is more or less complete anæsthesia can be readily outlined on the limbs. These areas are represented by the shaded parts of Figs. 2 and 3. In the upper extremities in front, branches of the musculocutaneous nerve, which supply the skin on the outer or radial side of the forearm; branches of the median nerve, which are distributed to the palm of the hand, the thumb, and the palmar surface of the first two and one half fingers; and branches of the ulnar nerve, supplying the little finger, and half of the ring

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finger adjacent to the little finger, are the seat of the anæsthesia. Behind, the anæsthesia confines itself to the branches

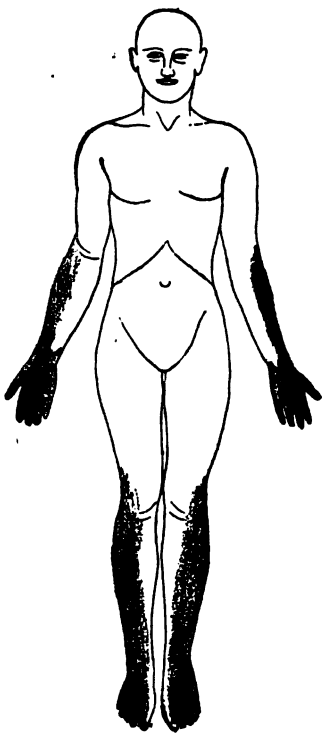

Fig. 2. Shaded areas representing anæsthesia in front of upper and lower extremities. Degree of anæsthesia indicated by shading

of the musculo-cutaneous nerve in the forearm, and the radial and ulnar branches in the hand.

The degree of anæsthesia is indicated by the lightness or deepness of the shading. For instance, in the hand in front, the median nerve being more affected than the ulnar, the area to which it is distributed is more deeply shaded, and the distribution and border line of the two nerves in the hand can be very clearly distinguished, as is shown in the difference in shading in Fig. 4. Fig. 5 illustrates different degrees of anæsthesia in the distribution of the radial and ulnar nerves in the back of the hand. Where the shading is deep, the anæsthesia is complete, the light shade representing slight loss of sensation.

In the lower extremities, the anæsthesia confines itself to the feet, except their inner surface, and to the outer and back part of the leg, below the knee. The nerves affected by this anæsthesia in front of the leg and the top of the foot are the external popliteal and the musculo-cutaneous; and behind, the external saphenus and the posterior tibial. The loss of sensation is greatest in the feet, and especially in the bottom of the feet. (See Figs. 2 and 3.)

The disturbance of sensations over the shaded areas in the figures may be briefly stated as follows: —

1. *Tactile Anæsthesia.*— The patient is unable to tell when objects touch the skin; cannot recognize objects, or tell one object from another when in contact with the skin; is unable to localize place touched on surface of limb by an object; cannot tell whether one, two, or more points touch the skin at any single contact; sensibility of skin to the faradic current much diminished.

2. *Thermo-Anæsthesia*, or a loss, partial or complete, of the cold-sense and heat-sense. He cannot readily tell when an object is hot or cold when applied to the skin. This loss of sensation is more marked in the feet and hands.

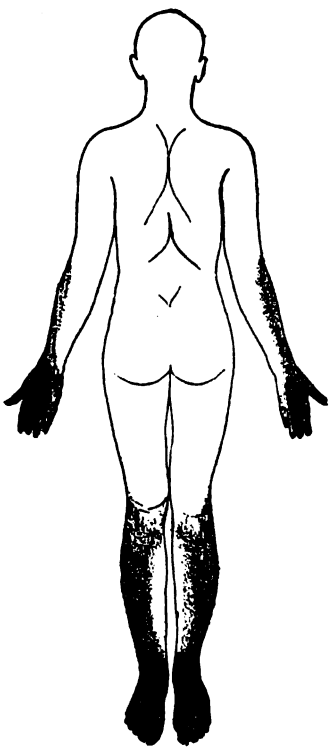

Fig. 3. Shaded areas representing anæsthesia in back of upper and lower extremities. Degree of anæsthesia indicated by shading.

3. *Hyperalgesia*, or an increased sensibility to painful sensations. Lightly drawing a blunted instrument across the

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bottom of the feet causes a painful sensation to travel up the legs. Slightly pinching or pricking the limbs causes

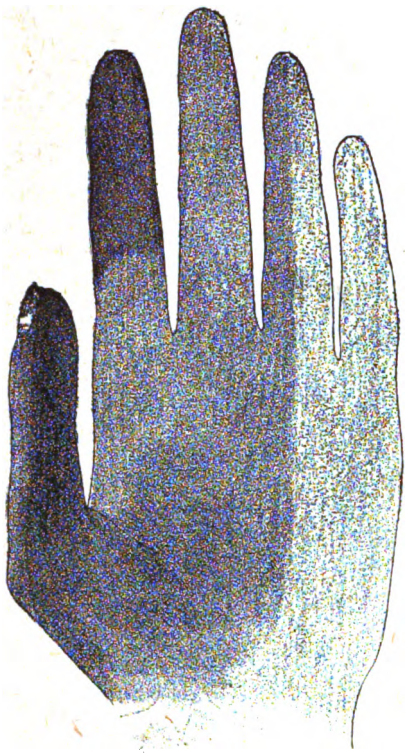

Fig. 4. Different degrees of anæsthesia in the distribution of median and ulnar nerves in front of hand; also an atrophy of muscles of hand.

pain. The increase of the pain-sense is not confined to the areas of anæsthesia.

4. *Delayed Sensations to Touch and Temperature.*— Impressions of touch and temperature that are recognized require a longer time than normal to reach the brain.

5. *A Loss of the Muscular Sense*, as manifested in ataxic and incoördinated movements. This also affects a larger part of the limbs than is covered by the shaded areas in the figures.

Trophic and Vasomotor Symptoms.—The muscles in the upper and lower extremities, especially those below the elbows and knees, are soft, flabby, and wasted, and have lost their natural elasticity and firmness. In the smaller muscles of the hand and feet the atrophy is most marked. The thenar eminence is flattened in both hands. Figs. 4 and 5 show a wasted condition of the muscles of the ball of the thumb and the smaller muscles of the hands. The skin on the hands, arms, feet, and legs is dry, harsh, wrinkled, has lost its natural softness, and is beginning to peel off. The nails are glossy, and have a white band across them transversely in the center. (See Fig. 5.) This peculiar marking of the nails, I believe, is a rather rare symptom of this disease, as I have seen only one other case reported (by Dr. Bielschowsky, in the *Neurologisches Cantralblatt*) in which it was present. The bloodvessels of the feet and hands are relaxed and distended; the skin in the hands and feet is reddish in appearance, due to vasomotor disturbance. There is also some œdema of the feet.

Mental Symptoms.— The mental symptoms in this case are not prominent. The patient, however, is given to despondency; has fits of mental depression in which he fears that he will never recover his health.

Treatment.— At the beginning of treatment, the patient was kept off his feet

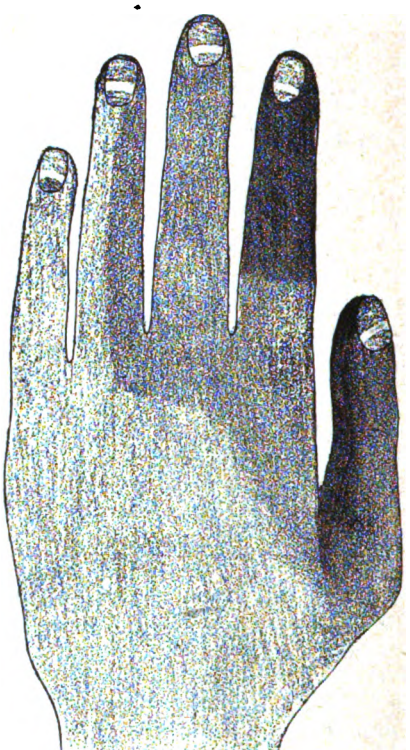

Fig. 5. Different degrees of anæsthesia in the distribution of radial and ulnar nerves in back of hand; also peculiar transverse marking of nails.

entirely, and all attempts at muscular exercise were interdicted. Three or four hours out-of-doors, lying on a cot or in a

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wheel chair, was part of his daily program. Hot blanket packs were applied to the arms and legs continuously for an hour twice daily. During the night, wet cotton packs were applied to the legs below the knees, and to the arms below the elbows, and worn all night. The packs were applied as follows: Wet cotton cloths wrung out of tepid water were applied directly to the limbs, these covered by dry cotton batting, and over this a layer of oiled muslin, and all bound firmly to the limb, the object being to retain heat and moisture during the night.

The patient's nutrition received proper attention. He was placed on a wholesome and nutritious diet, and ordered to drink freely of water, the bowels being regulated by diet and massage.

Almost immediately, as the result of this treatment, the severe pains from which the patient had been suffering for some weeks previously, were relieved to the extent of making the patient comfortable, and the numbness and anæsthesia soon became much less. His strength began to improve rapidly, as was shown by repeated tests with the mercurial dynamometer, and the natural firmness and elasticity of the paralyzed muscles began to return.

At the end of one month, in addition to the above treatment, a galvanic current of electricity was applied daily by placing a large electrode attached to the negative pole of the battery at the base of the spine, and making a labile application with the positive electrode over the upper and lower extremities, each treatment occupying about twenty minutes. A general massage three times a week was also added to his regular treatment. At this time, the patient was ordered to his feet and directed to begin a course of exercise, which was carefully outlined. There was continued improvement. The numbness, burning, pain, and other sensory symptoms were fast fading away. He continually increased in strength, and his out-of-door walks grew longer. After being under treatment seven weeks, he was able to walk two miles without a cane, and had increased several pounds in weight. At the end of two months, the soreness and pain having almost entirely disappeared, the faradic current was applied to the muscles three times weekly, and the applications of the galvanic current were reduced from daily applications to three times weekly. At this stage of the disease, still more importance was attached to sufficient and proper exercise; and careful measurement of the strength of the different muscles was again made, and an exercise prescription consisting of work in the gymnasium adapted to developing the weaker muscles, and exercise out of doors was carefully and fully followed out.

The above course of treatment was followed for another month. At the end of that time, or about three months from the beginning of treatment, the patient discontinued treatment, and began manual labor on a farm. The severe, dull aching, and sharp, shooting pains in the limbs had disappeared some time before quitting treatment. The "numbness" and "deadness" and anæthesia in the extremities had also disappeared, with the exception of some lingering numbness in parts of the hands and feet where the anæsthesia was most marked at the beginning of the disease. The patient's gait was quite natural. The ataxic symptoms, so prominent at first, were now present only in the slightest degree, and could only be detected by the closest observation. He could stand and walk well with his eyes closed. The muscles had regained their natural firmness and elasticity. Those muscles which had been badly wasted by disease, were very much increased in size. The electrical reactions had returned to the normal. The patient had gained twenty pounds in weight, and was able to do a full day's work at manual labor on a farm.

(To be continued.)

FACTS AND DOUBTS ABOUT CHOLERA.

BY L. BREMER, M. D.,
St. Louis, Mo.

(*See frontispiece in April number.*)

ONE would think that the etiology of cholera being settled beyond cavil, and the unity and specificity of its organized virus being firmly established, it would not be difficult to arrive at harmonious conclusions as to the manner in which it spreads and the means best calculated to prevent it from becoming epidemic.

The cholera vibrion is, indeed, to-day the best known of all bacteria, and its

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biological properties have been so assiduously studied by a large number of competent investigators, that it seems strange that there should prevail so much difference of opinion even on the most fundamental and elementary points bearing on the cholera question.

This divergence obtains even on facts evolved by laboratory experiments, and when a definite and uniform conclusion has been reached in the laboratory, it is often difficult and in some respects impossible to make the experience, gathered under artificial conditions, to tally with certain phenomena presented by the disease itself. This discrepancy between experiment and disease is in keeping with what is ordinarily observed in the theory and practice of medicine; viz., that the experiments performed by man are in most instances as yet, poor counterfeits of those made by nature herself.

Still, the laboratory experiment, crude and incomplete as it may seem, when compared with the complicated and often hidden and quasi-mysterious manifestations of nature's workings, is in our present state of knowledge the touch-stone capable of enlightening us on that which is essential and that which is incidental and indifferent in disease, and thus preparing and clearing the road for exact knowledge and correct and efficient action based thereon.

This being admitted, the discrepancy just alluded to is rather discouraging to the friend of rational, exact, and progressive medicine. Thus, it seemed to be established beyond the shadow of a doubt that in Koch's cholera vibrion the exclusive and specific bacterium had been found. If, however, the observations of Cunningham, who studied cholera in its home in India, are correct, there are at least ten different spirilla well differentiated by certain biological characteristics, all of them met with in the intestines of cholera patients, and, what is more, there are cases of cholera without any spirilla.

This announcement is startling because so entirely subversive of the very foundations upon which the modern doctrine of the cholera question has been erected, that for the present its correctness may well be doubted, because it is at irreconcilable variance with the results of the investigations of all other trustworthy observers.

The unity and specificity of the cholera virus is to-day, at least, as firmly settled as that of tuberculosis or anthrax; but this virus is not the comma bacillus, as it is still currently stated, but the cholera vibrion, or, still more exact, the cholera spirillum.

When Koch first discovered it, he formed his conclusion as to the etiology of cholera on the appearances of the microbe as found in the dejections of cholera patients, and on cultures obtained in gelatine. Later researches showed, however, that the comma form represents only the fragments of a maturer phase of development, which is spiral in shape, and hence is called spirillum, or, from its wriggling motion, by the older name of vibrion. This spiral form of development, often presenting long filaments, is best obtained in bouillon cultures.

The other competitors of the now universally recognized specific cholera microbe, Finkler's and Prior's vibrion, and the so-called Neapolitan bacillus, had to yield their aspirations to ætiological dignity, and may now be considered to be definitely disposed of as pathogenic factors in cholera. The different biological behavior of Miller's comma bacillus as a normal inhabitant of the mouth, and that discovered by Deneke in cheese, have long since been proven to be too distinct in their biological behavior from Koch's microbe to deserve any extended discussion.

For a long time, the doctrine that the lungs were the portals through which the virus found entrance into the organism in all epidemic diseases, counted the greatest number of adherents. The pathogenetic role of the "miasmata" was founded on this hypothesis. Thus it was thought that, as the poison of typhoid, entering through the lungs, localized in the lower part of the ileum, and that of variola, entering through the same portal, had a selective affinity for the skin; so cholera was also inhaled, selecting the upper part of the small intestines for its local manifestations. A direct inoculation through the blood in the manner of diphtheria, which, finding access through a solution of continuity of the skin, produces by preference local lesions in the fauces or larynx, was perhaps not much taken into consideration, although the former classification of cholera as a contagio-miasmatic disease would

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point in that direction. In the present state of knowledge, only one mode of entrance can be admitted; this is through the intestinal tract. For the blood, through which the cholera vibrion would have to pass before colonizing in the small intestines, does not, according to experiment and post-mortem finding, offer the necessary conditions for its maintenance and proliferation; the living blood is poison to the cholera microbe; it kills it.

Supposing, now, that the cholera microbe, in order to gain access to the upper part of the small intestines, *i. e.*, that part of the human organism where it finds all the conditions favorable to its development, has for its exclusive portal of entrance the alimentary tract,—that, in other words, it is eaten or drank,—where do the disease and death-producing organisms come from?

This question brings us face to face with the momentous controversy, which, immediately on the discovery of the cholera vibrion, divided the reigning authorities into two camps. Up to the time of Koch's discovery and the conclusions that he based on it, Pettenkofer's theory of the local and temporal disposition as being indispensable to the existence of an epidemic, had reigned supreme in the medical world. Pettenkofer himself had postulated the existence of a parasite which alone could explain the fact that the masses of the population were stricken with the disease. But in contradistinction to Koch, who, on the strength of his observations, claimed that the specific vibrion, as it passed with the dejections of cholera patients, was itself sufficient to set up the disease after gaining access to the intestinal tract of a predisposed individual. Pettenkofer, backed by statistical material covering a number of former epidemics and collected with a wonderful amount of industry and ingenuity, maintained that the parasite, in order to develop its deleterious and poisonous properties, had to undergo a sort of maturing process in the soil, and that to this end a porous permeable soil, rich in humus, and a certain temperature were necessary to the production of an epidemic. This was the famous local and temporal disposition alluded to above.

In order to elucidate and make plausible his theory, he called to his aid the best known and most firmly established fact in all nycology, the analogon of saccharine fermentation, investing it at the same time with a mathematical formula. The yeast plant (x), he said, needs a solution of sugar (y), in order to give rise to a product, alcohol (z). In the same manner the cholera vibrion (x) needs a proper soil (y) to produce the disease, cholera (z). Whether his observations on the rise and fall of the ground water always corresponding with the rise and fall of the morbility and mortality of the prevailing epidemic, will be verified and amplified in future epidemics, or whether the apparent causal connection between the two will be shown to be a mere coincidence, although a very curious and striking one, is a matter of great interest and importance. For the present the "contagionists and drinking-water theorists," as Pettenkofer dubbed the followers of Koch's doctrine, have the upper hand in this controversy, and the experiences gathered so far in the present epidemic do not tend to strengthen Pettenkofer's position. True, there is still a disposition on the part of the friends, and it must be said even on that of some of the followers of the new school, to reconcile the soil-theory with that of contagion; but to the impartial peruser of the literature on the subject, these attempts seem like a sort of reaction following the great bitterness and animosity which have marked the controversies of the past on this subject.

It speaks well for the hearts of these savants to let the father of scientific epidemiology down easy, after it has been demonstrated to be wellnigh a certainty that he was on the wrong track, a track on which, however, he did remarkable and faithful work.

Foremost of these mediators is Hueppe, one of the most eminent and industrious bacteriologists of our time. Hueppe claims to have discovered, contrary to Koch and his immediate followers' assertions, that under certain conditions sporulation takes place in the cholera microbe, and that consequently a possibility of the parasite to live and proliferate outside the human body exists. This exogenous formation of the cholera virus as opposed to the exclusively endogenous one, as taught by Koch, is indeed, the *sine qua non* of Pettenkofer's doctrine. Admitted, that the parasite which bacteriology had so far shown to be extremely delicate and vulnerable outside of the human body, could under certain

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conditions live and multiply in the soil; that, in other words, instead of being a strict parasite it could live like ordinary bacteria of putrefaction, and lead a saprophytic existence, a powerful prop to the tottering edifice of Pettenkofer's doctrine would have been furnished.

Such lasting spores, now, similar to those of the anthrax bacillus, able to withstand all kinds of deleterious influences, and waiting only to be incorporated in the human organism, in order to develop and set up the dread disease, are said to have been observed by Hueppe. Supposing, then, that the cholera vibrion is accidentally sown in congenial soil, *i. e.*, porous and rich in humus, that a favorable temperature exists, that the ground water recedes, leaving only a so-called evaporation-zone furnishing the necessary amount of moisture to the microbe, all the requisite conditions for an epidemic will be there. The spores will be communicated to the surrounding atmosphere, will gain access to the alimentary tract of mankind, and an epidemic results.

The existence of these spores is, however, strenuously denied by nearly all other competent investigators, and all experiments to cultivate the cholera vibrion in the ground have failed. No matter in what quantity or in what state of development or virulence the microbe is committed to the soil, in one or two days there is no trace of it left. Therefore, although epidemicologically Pettenkofer's teaching may seem plausible enough, biologically there are very many arguments against it.

These lead us to the pivotal point of the whole question; viz., the biological properties of the cholera vibrion.

Koch has found that this microbe was extremely pretentious in its life-habits, and required a number of congenial conditions in order to maintain itself outside the body. Thus, a slight degree of acidity, dryness, and above all, the presence of other bacteria, would hamper or prevent its growth. Owing to this pretentiousness in its life-habits, some epidemiological facts could be explained, while others refuse to be reconciled with the results of biological research.

According to the concurring testimony of all observers, the cholera vibrion, in order to thrive outside of the human body, requires plenty of oxygen; it is an aërobe. When planted, for instance, in water, it will rise to the surface and form a film, whereas in the depths of the fluid no trace of it can be discovered. The supply of oxygen, however, although it increases the resisting power of the microbe, lessens its virulence. Hence the often observed fact that after a few generations in gelatine or on other cultivating media, the cholera vibrion has lost all its pathogenic properties, and has degenerated into a harmless saprophyte. The virulency, however, may be re-established by placing it under conditions similar to those that prevail in the intestines.

If, e. g., a pure culture which has lost all trace of virulence, be planted in an egg through a fine aperture made in the shell, the hole sealed up, and the egg placed in a brooding oven, there is, if the aërobe conditions, the soil, and the warmth be approximately reproduced that prevail in the small intestines, where the vibrion develops its highly poisonous properties, an extremely virulent microbe results, which, however, is also remarkably perishable. This is Hueppe's experiment, whose importance cannot be over-estimated. It teaches that, whereas the free access of air facilitates the growth of the microbe and its resisting power, by providing it with a protecting membrane, deprivation of air tends to increase its virulence, but enfeebles its power of vitality.

Koch teaches that the cholera vibrion is an hydrophilous bacterium, that the danger of epidemics lies in infected water courses. Now it is a fact, denied by no one, that the cholera vibrion thrives only in sterilized water, *i. e.*, where there is no competition of other bacteria; that in the struggle for existence with all the known saprophytes, our microbe succumbs, and disappears from the field of competition in the same ratio as other microbes abound. This is true of water, of the soil, and of other substances harboring micro-organisms. In feces, for instance, unless sterilized, and urine, especially when decomposing, the cholera vibrion speedily dies. The more dirt, the greater the stench, the surer the annihilation of one vibrion.

The worst, the most certainly germicide surroundings, are a mixture of decomposing feces and urine. It kills the cholera germ as surely as the most powerful antiseptic.

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In the face of such facts yielded by rigid and exact experiments, it is amusing when one reads of reports that such and such a place is fairly "reeking" with bacteria, and that it forms a dangerous brooding ground for the cholera microbe, should that disease ever take a foothold. Paradoxical though it may seem, such places would, in the light of strict experiment, seem cholera-proof; for whenever there is stench from putrefaction, there are the saprophytes, the cause of decomposition, and there are the implacable and invariably victorious enemies of the cholera vibrion.

How does this compare with clinical and epidemiological experience? It certainly is true that where there is the most dirt and filth, there is also the greatest harvest of cholera epidemics. But it is equally true that where there is most squalor, there is generally the greatest crowding of people in narrow rooms, the greatest facility of personal contact, and the least resisting human organisms, owing to hunger, exposure, disease, debauch, etc. It is not the soil, then, that breeds the disease germs, although this possibility must still be admitted and remain an open question, but it is the personal contact, the transferring of the pathogenic microbe by soiled clothing and unclean hands, to drinking and eating vessels or the fluid and solid aliments themselves. How else could the ship epidemics be explained that we have recently witnessed?

That cleanliness, not only personal, but also public, will still be the chief safeguard against the approaching foe, is too much a matter of course to deserve more than a passing notice. But this cleanliness must be of the sterilizing kind, and must not be confined to the body and its clothing, but also to what we eat, and especially what we drink.

Now, all the ordinary foods in the raw or boiled state, provided they have no acid reaction, are favorable cultivating grounds to the cholera vibrion, even the boiled potato, in spite of its acidity. Very naturally the attention of investigators has been particularly directed to milk, the recognized and most dangerous of all disease-carriers. Here again the paradox presents itself, that slightly spoiled milk does not offer the vibrion any chance of taking a foothold, because other bacteria have already taken possession, killing the new-comer on its first appearance. Only quite fresh and unadulterated milk offers our vibrion a chance to produce its like. One more proof that this microbe requires everything of the cleanest and best to thrive: If, now, this germ is so very particular as regards the company of less exclusive micro-organisms, how is it that rivers can be declared infected as has been done of late in Germany? Certainly, in order to make such a declaration, specific vibrions must have been found in these rivers, which, flowing as they do through great centers of population, are not lacking in ordinary putrefaction bacteria, the foes of the cholera germ? And did the much talked of and often quoted tank in India, which swarmed with cholera microbes, in which the natives washed their linen, and out of which they drank in turn,— did it contain the vibrion in pure culture? Common sense speaks against such an assumption. Hence we must conclude that the laboratory experiment is once more at variance with that performed by nature.

In view, then, of so many and vital contradictions, what is there of a positive nature in the cholera question? Above all, has it ever been proven beyond peradventure that cholera can be communicated by contact, or that it can be eaten or drunk? We have just witnessed the clownish spectacle of a reporter in Hamburg who willfully sought the danger of contact and of drinking infected water, with a view of proving that he was cholera-proof, owing to an anti-cholera inoculation.

Before him, a foolhardy Frenchman, Bochefontaine, swallowed pills made of feces of cholera patients, and Klein, who ought to have known better, did the same in Bombay. None of them were attacked by the disease. What did this prove? If anything, perhaps the long-known fact that fools are under the special guardianship of Providence.

Nor did the isolated case of cholera infection from a pure culture, occurring in Koch's laboratory, when there was not a single case in all Germany, prove the communicability of the disease by pure culture. Such questions are settled by hundreds and thousands of cases, but not by one or two.

(To be continued.)

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TRANSLATIONS AND ABSTRACTS

[This articles in this department are prepared expressly for this journal.]

TREATMENT OF HEPATIC AFFECTIONS.

BY DUJARDIN-BEAUMETZ,

Member of the Academy of Medicine, Physician to the Cochin Hospital, Paris.

Translated by J. H. Kellogg, M. D.

INFLAMMATION OF THE LIVER.

THE name "cirrhosis" is given to a chronic inflammation of the liver, characterized anatomically by general hyperplasia of the connective tissue elements, thus choking the hepatic cells. This simple definition is of recent date, and many years and much work were required to arrive at so clear and precise a conception of cirrhosis.

During many years the conception of cirrhosis was confused by the erroneous idea that the liver was composed of two substances, one red and the other yellow, and that the predominance of the yellow subance over the red was the cause of all the disorders resulting from chronic inflammation of the liver. Laënnec was the first to give the name of "cirrhosis" to this kind of inflammation, and to assert that the color was due to the granulations which are scattered thickly through the liver when thus diseased. Dujardin and Verger, in 1839, first maintained the opinion that two substances exist in the the liver, a red and a yellow substance, a view which Ferein and Andral had previously maintained. Becquerel supported the same view, but with other arguments. He maintained that the hypertrophy of the yellow tissue is due to the infiltration of these substances with a plastic matter of an albumino-fibrous nature.

Thanks to microscopical examinations, more precise facts relating to the anatomy of the liver were obtained, and in 1853, Gubler showed that in cirrhosis of the liver we have a hyperplasia of the connective tissue element, which, by destroying the cellular element, produces atrophy and deformity of the liver. This atrophy was, according to the authors named, most frequently partial in character, but constituted one of the characteristic features of cirrhosis. This last point was soon attacked.

In 1857, Todd showed that the atrophy which the preceding authors considered an essential element in cirrhosis, did not exist; and in 1876, Hanot, in his excellent work upon hypertrophic cirrhosis, confirmed the idea held by Todd.

Much work has since been done upon this point, and we are able to say to-day that there exists, not *a* cirrhosis, but many cirrhoses of the liver. That is to say, the hyperplasia of the connective tissue of the liver may have for its seat any one of the different canals which ramify through the liver, and it is this general idea which will guide me in the division which I propose to present to you of the different cirrhoses.

In studying the liver as a bile-making organ, and the liver as a blood gland, we have seen that the hepatic gland possesses not only biliary passages, but also afferent and efferent veins and nutrient vessels which are furnished from the arterial system. If we add to these conduits the lymphatic network, we shall have a conception of the different circulatory conduits which the hepatic parenchyma contains. Each one of these may set up in the cellular tissue of the parenchyma an inflammatory process to which may be given the name of cirrhosis. The most frequent and the best known form of cirrhosis originates in the radicals of the portal vein. This is the cirrhosis of Laënnec. The sub-hepatic veins give rise to a different pathological group. This is the cirrhosis of cardiac disease, the nutmeg liver of the ancient authors. Inflammation of the hepatic artery gives rise to a cirrhosis of which little is as yet known. This form of the disease is observed in arterio-sclerosis.

Inflammation of the biliary passages in the hepatic parenchyma, and of the radicals of origin of these passages, gives rise to a peculiar condition of the liver, which differs considerably from classical cirrhosis and from the liver of drunkards. It is the hypertrophic cirrhosis of Hanot.

Finally, the lymphatic network may be the point of origin giving rise to the cicatricial contractions. This is the cirrhosis of syphilis.

In this lesson I shall confine myself to the consideration of what is called alcoholic, or drunkard's cirrhosis, since

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other forms of cirrhosis are not curable, or are so little understood that their therapeutics is, so to speak, negative.

Since the means employed to combat hypertrophic cirrhosis with icterus are the same as those which are used in the treatment of ordinary cirrhosis, I shall consider the latter only. But we have, first, this question to answer: Is common atrophic cirrhosis curable? This form of hepatic cirrhosis has been very rarely cured in the absolute sense of the word; it has afforded, in a notable number of cases, a relative cure, and the ascites has disappeared for some years. The number of these cases thus far collected, amounts to nearly one hundred. Chrestien has suggested the utility of milk in the treatment of abdominal ascites, citing some cases of cure of ascites in drunkards.

Semmola, of Naples, in 1879, first indicated the possibility of the cure of alcoholic cirrhosis by an exclusive milk diet. According to Semmola, a cure is possible in the first stage of this disease, before the liver has undergone atrophy.

In 1874, Leudet called attention to the curability of ascites produced by lesions of the peritoneum in alcoholics.

In 1886, Troisier reported an observation in which the ascites disappeared after an abundant diuresis in a case of probable cirrhosis of the liver, and asked the following question: Does there exist a curable form of alcoholic cirrhosis of the liver? Successively, Dieulafoy, Letulle, Bucquoy, Rendu, Hichard, Millard, and myself communicated, during the year 1886 and the following years, a series of observations of evident cure of hepatic cirrhosis.

These observations may be grouped, as has been done by Willemin, in three distinct classes: —

1. A numerous group of alcoholic patients in whom ascites or hepatic symptoms disappeared under appropriate treatment, but who have subsequently been lost sight of.

2. In the second group, patients of the same class who have been kept under observation for from one to four years, a relapse being observed in nearly one half the cases.

3. Finally, in the third group, an intercurrent disease having occasioned the death of the patient, an autopsy has afforded the means of confirming the diagnosis of cirrhosis.

A man of 38 years who had come under my observation in the hospital Cochin for ascites, Feb. 17, 1886, was manifestly alcoholic. He showed all the marks of ethylic intoxication, trembling of hands, nightmares, etc. The ascites increasing, and the cachexia becoming more pronounced, the patient was tapped, 5½ liters of liquid being withdrawn. The tapping was performed March 10. The patient was given milk diet and a solution of hippurate of chalk. Under this regime the ascites was not reproduced, the patient gained in flesh, and although he was observed until May 26, the cure remained complete, except that an increase in the volume of the liver remained. On the 26th of May, unfortunately, he was allowed to go out. He improved the opportunity to get drunk, slept in the woods, and had a very severe chill. He returned to the hospital on the next day, the 27th, with pneumonia of the left lung, and died two days later. The autopsy was made with the greatest care. The liver weighed 2.7 kilogrammes (5.9 pounds). In cutting, the characteristic cry was heard, and the hepatic substance presented the classical granulations of cirrhosis. The spleen was increased in size, and weighed 800 grams (1.76 pounds). There had been peri-splenitis, as is the rule in the cirrhosis of Laënnec.

The histological examination showed the following conditions: Each hepatic lobule was surrounded with a large band of adult connective tissue, from which proceeded narrower tracts which penetrated into the interior of the lobule across the hepatic cells; but the hepatic cells were normal in most of the lobules. However, in a certain number there was a manifest fatty degeneration of the lobules. This autopsy showed very clearly that our patient had been affected with cirrhosis, in accordance with our diagnosis, but that the disease was but slightly advanced, the sclerous process having not yet destroyed the hepatic cells. This leads me to approach another point in the therapeutical problem, which it is necessary to solve.

(To be continued.)

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DIPHTHERIA AND ALLIED PSEUDO-MEMBRANOUS INFECTIONS.

DR. A. C. ABBOTT gives the result of Wm. Alleck Parks's investigations of these diseases, as published in the *Medical Record* of New York in August, 1892: —

In 159 cases of pseudo-membranous inflammations, there were 54 in which the Klebs-Loeffler or diphtheria bacilli were present, usually as the only or most numerous form of bacteria. With them were often associated streptococci and other micro-organisms. In every one of the remaining, streptococci were the most abundant bacteria, and often the only ones. From various pseudo-membranes the streptococci obtained differed in manner of growth and pathogenic action. The staphylococci were often entirely absent, at other times present in moderate numbers, but never in excess of the streptococci.

Location of Lesion. — In both diphtheria and pseudo-diphtheria the pseudo-membranes occurred on the mucous membrane of the nose, pharynx, larynx, soft palate, and tonsils. The tonsils were the parts most frequently involved. The nasal cavities were more often involved in true diphtheria.

In a large proportion of cases, evidence was obtained of the direct spreading of diphtheria through contact with infected persons and clothing. In only a few cases of pseudo-diphtheria was equally strong proof obtained.

It is important at the outset to remember that true diphtheria is frequently associated with pseudo-diphtheria, and this mingling of the two adds greatly to the clinical difficulties. Severe uncomplicated pseudo-membranous laryngitis may be either true or pseudo-diphtheria. The early clinical diagnosis is usually impossible. Low temperature, great prostration, and heart-failure point to true diphtheria. A high temperature, lung complication, and no history of infection, are in favor of pseudo-diphtheria.

Death occurring early, was usually due to heart-failure in diphtheria; when it occurred later, it was usually due to broncho-pneumonia, in pseudo-diphtheria.

Conclusions. — The results of previous investigations, with the addition of that brought out in these studies, seem to force on us the conclusion that there are two great divisions of pseudo-membranous inflammations, one caused by the Klebs-Loeffler bacilli, and the other by some form of streptococci. The few cases in which the pneumococcus of Fraenkel or other cocci seem the cause, naturally fall in the second division.

The first is, from beginning to end, a local process, and its lesions are due to the effects of the poison formed by the bacilli in the pseudo-membrane. It is dangerous at all periods of life. The second is also at first a local lesion, but may at any time become a general infection. It is peculiarly liable to cause broncho-pneumonia in children. Both diseases are frequently associated together. Both are directly contagious, though in different degrees.

These two diseases, caused by different bacteria, and differing in so many points, should no longer be called by the same name. The name diphtheria will probably be agreed upon by all for those cases in which the Klebs-Loeffler bacilli are present, whether alone or associated with other bacteria.

For the second division some name will have to be agreed upon; whether the streptococcus will be found to be in such a majority of cases the cause that the name "streptococcus diphtheria" can be applied to it, only further investigation can determine. Perhaps at present the term pseudo-diphtheria will be acceptable.

In all cases where the diagnosis is in doubt, bacteriological examination should be made, because,—

1. A correct diagnosis should always be sought for.

2. Without an examination, all attempts to learn from statistics the worth of special forms of treatment and methods of prevention, are well-nigh useless, from the frequent incorrectness of the diagnosis. The fact that during four months, less than one third of the cases sent to the diphtheria wards of the hospital had true diphtheria, is sufficient proof of the difficulty of making a clinical diagnosis.

3. It is a great help to prognosis and rational treatment in the more severe cases, and enables us to take measures more effectually to prevent the spread of the contagion.

4. It is certain, can frequently be made immediately, and always within twenty hours.

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Cure of Hydrophobia after Actual Outbreak.— The numerous experiments and continual practice in Pasteur's Laboratory to prevent and cure hydrophobia, have excited the interest and curiosity of the medical fraternity and laymen the world over. The following from the *Deutche Med. Zeit.* is of exceedingly great importance on the subject, and will be read with satisfaction by all who have ever thought of this dreadful disease: —

"Prof. Guido Tizzoni and Dr. Eugenio Cantanni of the Pathologic Laboratory in Bologna, have published further results of their experiments on curative treatment of hydrophobia. They had demonstrated already that the blood of rabbits immunized against rabies had the property, not only of preventing rabies and of arresting its development, but also of curing this disease after it has reached a somewhat advanced stage. They had tried also to demonstrate that this substance is precipitated by alcohol, and that the precipitate being taken up again in water, when mixed in vitro with an emulsion of the spinal marrow of a rabietic dog, completely destroys its virulence. On the other hand, the attempt to cure animals affected with rabies by applying this alcoholic precipitate in the same manner as the serum itself, proved a failure. This induced the authors to institute a new series of experiments with a material taken from animals immunized in a higher degree than the degree corresponding to the constant virus. The material for these new experiments was taken from animals that were immunized against the constant virus and that had resisted once or several times subdural or endovenous inoculation of this same virus. The authors found indeed that the alcoholic precipitate from the serum of these animals not only caused protection of the organism against rabies, but possessed this immunizing action in such a high degree that it also cured rabies, even after the first symptoms of the disease had made their appearance.

"This is certainly in the opinion of the authors a fact of considerable scientific and practical importance, inasmuch as henceforth it will be possible to prepare the active principle in a form in which it may be preserved without alteration for undetermined time, collected in larger quantities, and, if necessary, sent to other localities.

"At the same time the *Reforma Medica* brings the announcement that in the Anti-rabietic Institute of Bologna the first cure of hydrophobia in an already advanced stage was effected by a special mode of the Pasteur treatment. A man bitten by a rabietic dog, who had subjected himself to Pasteur's preventive treatment, was seized with the phenomena of paralytic rabies. Paralysis having progressed from the lumbar region over the whole organism, bladder and rectum included, intravenous injections of the fixed virus were administered, whereupon the painful symptoms gradually diminished, and finally perfect cure was accomplished. If, as is to be expected, further observations should give the same result, it would mean the discovery, not only of a preventive treatment, but of a curative treatment of a disease, the result of which has always been fatal up to the present time."

Tuberculosis from Circumcision.— Ten Hebrew boys, circumcised by a consumptive physician, whose saliva came in contact with the wound, are reported to have become affected with the disease. The symptoms of consumption developed within ten or fifteen days. It is certainly most reprehensible conduct, in these days of knowledge, for a physician to be so careless in his practice. Or is it possible that so gross ignorance still exists among medical men?

Incompatibility of Anti-febrine.— The extensive use of anti-febrine at the present time renders important a knowledge of its incompatibility. Several drugs, of which the following are chief, are precipitated from an aqueous solution, and hence destroy its therapeutic effect: carbonic acid gas, tannin, iodine, calomel, and corrosive sublimate. It is also decomposed by a number of substances, when mixed with them in a dry state, as on rubbing together in a mortar; chief of which are calomel, chloral, bicarbonate, salcylate of soda, and a solution of quinia and caffeine. Beta-naphthol also has a like effect. Calomel forms a poisonous substance with anti-febrine.

The above is given on the authority of the *Gazette des Hopitaux.*

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Cure of Snake-Bite by Inoculation. — Following in the footsteps of bacteriology, practical tests have been made in the treatment of snake-bites by inoculation. The substance used for these inoculations is the blood of animals immune against the snake-bite. Mr. Dinshah Ardeshir Taleyankhan, commissioner of Baroda, India, has issued a pamphlet on this subject. He describes the weasel as an enemy of the snake, and says that it will attack and kill any snake that it comes across, without suffering from the venom of the bites it receives. He suggests, for this reason, that the blood serum of the weasel be injected in case of snake-bite, and that it may prove an effective antidote.

Nature's Cure for Consumption. — The prevailing idea that people once having had tuberculosis are doomed to death from this cause, has long been known to be faulty by those who have given the matter a thought, and have had the opportunity of studying pathological tissues at or after post-mortem examinations. In medical colleges where dissection is carried on on a large scale, and in hospitals where autopsies are practiced skillfully with a view to keeping records of the conditions found, the ravages of the germ of consumption have often been noticed to have been checked seemingly by nature herself, that is, by the power of the cells forming the bodies affected.

Dr. Henry P. Loomis (*Medical Record*) gives a summary of numerous cases of phthisis which have come under his observation, as follows : —

"1. Out of 763 persons dying of a non-tubercular disease, seventy-one, or over nine per cent, at some time in their life, had had phthisis, from which they had recovered.

"2. The new fibrous tissue by which the advance of the disease was apparently checked and the cure effected, developed principally by round-cell infiltration of the interlobular connective tissue, which in some instances had increased to an enormous extent. Some of the new fibrous tissue was formed later by round-cell infiltration in the alveolar walls and around the bloodvessels and bronchi. Pleuritic fibrosis appears to be secondary to tubercular processes in the lung substance, The interlobular connective tissue is the primary and principal source of the fibrosis.

"3. Tubercle bacilli were present in the healed areas in three out of twelve of the lungs examined. These healed areas did not differ in their gross or microscopical appearances from those in which they were not found.

"4. Thirty-six per cent of all cases where the lungs were free from disease showed localized or general adhesions of the two surfaces of the pleura."

Chloroform in Cholera.—The interest in the treatment of cholera, both preventive and curative, increases as summer advances. Desprez has recently called attention to the fact that he has employed chloroform in the treatment of cholera since 1864. According to him, this drug not only destroys the comma bacillus, but neutralizes the poisonous products produced by the microbe, that is, relieves the painful spasms of the stomach which cause incessant vomiting, and thus answers some of the most important indications in the treatment of this malady. This eminent physician recommends that persons who come in contact with cholera patients should take several times daily, before and after eating, half a glass of a 1 per cent solution of chloroform water. It occurs to us that this dose is rather large. We would recommend 1 to 2 tablespoonfuls of a 1 per cent solution, instead of half a glassful.

New Test for Albumen and Sugar. — Dr. Lacquer of Wiesbaden has formulated the following test, by which the presence of both albumen and sugar may be determined with a single quantity of urine in the same test-tube : —

Test for Albumen. — Heat to the boiling point a test-tube one fifth full of clear urine. Pour (not drop) now one tenth the volume of dilute nitric acid. Set aside at once without further boiling. If a permanent flocculent precipitate is formed, albumen is present, and the specimen should be set aside in the cold until the precipitate subsides. Then filter and apply the test for sugar. The test for sugar may be employed immediately, if the urine remains clear.

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Test for Sugar.— Add 10 to 20 drops, or one tenth to two tenths of the volume of Almen's solution, and boil one to two minutes. A deep brown or black color indicates the presence of sugar.

Almen's solution is made by dissolving 1 dram of Rochelle salts in 25 drams of a 10 per-cent solution of sodium hydrate. Then add one half dram of bismuth subnitrate, and digest on water bath with frequent stirring, until as much as possible of the bismuth has been taken into solution. Filter. The clear solution will keep in a dark bottle for several months. The reaction consists in the reduction of glucose by a bismuth oxide in an alkaline solution. This is a modification of Boettcher's test. It is sufficiently delicate to detect the presence of .1 per cent of sugar, and even less. The reaction is much more pronounced, constant, and positive than either Trommer's or Felding's test, and is not affected by uric acid or creatinine, as is Trommer's test.

Alcoholic Solutions of Mercuric Chloride.— It ought to be generally known that alcoholic solutions of mercuric chloride are unstable. This is especially true when such solutions are exposed to light. The mercuric chloride is changed, by the loss of chlorine, to mercurious chloride, which falls as a precipitate. The precipitation is not prevented by ammonium chloride or other chlorine solutions. Experiments made at the Royal Infirmary of England showed that passing chlorine gas through an alcoholic solution of chloride of mercury, prevented the change referred to, and that a solution so treated will keep indefinitely.

Benzo-Naphthol in Bacterial Intestinal Diseases of Infants. — Menthol benzoate was used with marked success by Moncarvo (Rio de Janeiro) to arrest intestinal fermentation in children of all ages, especially in diarrhœa of malarial origin. The drug was tolerated very well, and the benzoic acid formed from the decomposition of the remedy in the system was eliminated by the kidneys in the form of hippuric acid, and consequently it must act as a diuretic. The dose varied from four to twenty-two grains according to size and age. In rebellious malarial diarrhœa, the addition of equal parts of salycilate gives excellent results. The writer has used benzo-menthol with benefit in yellow fever. P. P.

Aneurism of the Aorta Cured.— The aneurism was located in the descending aorta, and was so large that some of the ribs of the vertebra had been absorbed. The Baceli method was employed to produce coagulation of the blood. In employing this method, a watch spring 1–12 of an inch broad and two inches long, coiled, was introduced into the aneurismal sac by sharpening one end of the spring, and pushing it through a small slit. The improvement in the patient's symptoms was very rapid.

Cure of Spinal Bifida.—Berger reports a case of cure of lumbar spinal bifida in a babe aged seven weeks, by introducing a portion of the scapula of a young rabbit. The cure has now been maintained for five months.

Anti-Cholera in India. — According to the *British Medical Journal*, anti-cholera inoculation is being carried out on a large scale at Agra, India. Several hundred people promptly volunteered to undergo the inoculation when M. Haffkine arrived with the material for the work. Most of these were British officials and British residents. Some native residents were also included among those inoculated. Natives are, as a rule, very unwilling to submit to inoculation in consequence of the fact that the material used is obtained by cultivating the cholera germ in beef broth, or other animal products. High castes are rigid vegetarians and are not willing to have even a dilute solution of beef tea injected into their bodies. Efforts are being made to find some method of cultivating cholera germs which will not require the use of animal products of any sort; this the bacteriologists will probably find somewhat difficult of accomplishment, since it is noted that for the development of pathogenic microbes, it is necessary, in most cases at least, that they should be propagated in animal products, or substances containing them.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Germ Theory in Relation to Cancer.—The following, from the pen of Prof. John Caven, of the University of Toronto, appears in the *Canadian Practitioner* for January, 1893: —

"From present indications, it would seem highly probable that cancer will presently be added to the list of diseases depending for their causation upon the growth of some form of germ. Virchow, in 1851, described the occurrence in the epithelial elements of carcinomata of certain bodies which he took to be young epithelial cells; the process by which they originated he spoke of as 'endogenous cell formation.' Judging from Virchow's description, one cannot avoid the conclusion that the founder of modern pathology saw those bodies which many recent workers regard as parasites, and as the probable exciters of the cancerous process.

"The discoveries of the vegetable germs of anthrax, and, later, of tuberculosis, followed, as they were, by others belonging to the same kingdom, naturally led many to expect that the cause of cancer would be found among the bacteria, and, working with this expectation, more than one investigator has claimed to have discovered the desired organism. Notable among these were Scheuerlen, Kubasoff, and Russell. The results of none of these men have stood the test, however, and more recent investigators would have us believe that the cause looked for is to be found, not in the vegetable kingdom, but among the lower forms of the animal kingdom — the protozoa. Since the publication of the observations of Darier on follicular psorospermosis, and of Pralassez and Albarron on coccidia in epithelioma, in 1889, a great amount of labor has been gone through in the attempt to settle the question as to the relationship of these or similar organisms to cancerous growths. Those who wish can find a historical sketch of this work in the article on 'Parasitic protozoa in cancerous tumors,' by Ruffer and Walker, in the *Journal of Pathology and Bacteriology* for October, 1892.

"In the above article, Ruffer and Walker describe a number of different cell forms which they have been able to demonstrate satisfactorily by new methods of staining, and of which they present very careful and beautiful drawings. They do not claim that similar appearances have not been observed before, but do think that their methods place the parasitic character of these cells beyond question. It is worth noting that M. Metchnikoff, who has inspected these slides, believes that they have accomplished all that they claim. The organisms are described as occurring singly or in groups *within* cancer cells only, and in the growing parts of a cancer. In only three cases out of a large number examined were they not to be found. Ruffer has, since the appearance of the above, published a note in the *British Medical Journal* of Nov. 5, 1892, in which he claims to have seen the development of the parasites within the cell nuclei, and their final escape from the nucleus into the cell protoplasm.

"That carcinoma is infectious, and therefore most probably parasitic, has been proven by the experiments of Hanan on rats. It is said also that in one instance, at least, transplantations have been successfully carried out in the human being, but these were from one part of the same person to another. It has hitherto, however, been found impossible to infect an animal with cancer taken from another of a different species. This is curious, in view of the supposed fact that epithelial cells transplanted from one animal to another, *e. g.*, frog to man, in skin grafting, will grow. We cannot yet be said, then, to have gotten farther in our proof than the first postulate of Koch."

Three Infectious Diseases at the Same Time.—Dr. Nash reports, in the *British Medical Journal*, the case of a child of three and a half years in which appeared, within a week, the following infectious maladies, in the order mentioned: Whooping cough, chicken-pox, and measles. If all these microbic diseases produced chemical poisons at the same time, it was a point of interest that each should flourish without interfering with the other. This, of course, is a doubtful question.

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Detection of Typhoid Bacillus in Boiling Water. — Dr. Ströll recommends, for the investigation of water of running streams suspected of being contaminated by the affection of typhoid fever, the use of "frames covered with cotton goods so placed in the stream that the water flows through them." They act as filters, and catch all the dirt in their meshes. The frames are removed from the water after being there several hours, and sprayed with sterile water. The sediment of this wash is drawn off after the liquid is thoroughly settled, and investigated in the ordinary way.

The Use of Chamberland Filters. — Drs. Acosta and Granda, in an article in *Centralblatt für Bakteriologie u. Parasitenk.*, refers to the popularity of these filters in Havana, Cuba, owing to the fact that the drinking water in the city is for the most part very bad. These physicians conducted their experiments with a view to determining if there is any reliability in the use of the Chamberland filters. Their conclusions are, that, for domestic purposes, owing to the carelessness of most families in using them, these filters are not only false security, but are positively harmful. In laboratories, where they can be employed with proper precautions, they are unquestionably good, but they are to be discouraged for household purposes.

Bactericidal Property of Blood-Serum. — Dr. Jetter, in his researches on this subject, finds, as Haffkine and Christmas have found, that the methods pursued to determine the disinfectant properties of the blood of the body, have given misleading results. In the *International Medical Magazine*, Dr. Abbot ends a note on the subject in the following language: —

"The conclusion that has been drawn from these experiments has been that the reduction in number experienced by bacteria when introduced into blood-serum, results from the positive germicidal activity of the serum. In experimenting with a number of other substances, some of which were the ordinary materials used for cultivating bacteria, he has noticed, after inoculation, a diminution in the number of organisms originally introduced, so like that observed when the same organism is introduced into the blood-serum, that he believes this reduction to be due, less to a positive germicidal power of the blood-serum than to the actual death of the organisms, resulting from being transferred from a medium upon which they have been accustomed to grow, to another of somewhat different constitution.

"Coming, as this work does, from a laboratory worthy of confidence, these results, though somewhat startling, cannot be ignored. In consideration of the personality of those who have worked upon the blood-serum question, the hypothesis advanced by Jetter must be held an open question."

Immunity from Cholera Conferred through Milk. — The following note on this subject was translated from the *Prog. Médical*, and published in the *Canadian Practitioner*: —

"M. Ketcher says Ehrlich has demonstrated the possibility of conferring immunity to the poison and infection of tetanus through the agency of the milk of a previously vaccinated animal, etc. We have injected a virulent culture of the comma bacillus into two goats, subcutaneously, intraperitoneally, and intravenously. Five c.c. of the milk of one of the vaccinated goats protects a guinea-pig against a fatal dose of the comma bacillus, into whatever part the injection be made. The milk of an unvaccinated goat does not possess any immunizing power at all. The milk of a vaccinated goat injected into the peritoneum of a guinea-pig, not only immunizes it against any future infection, but even cures an already existing attack of cholera."

Micro-organisms in the Milk of Healthy Women. — It has been supposed that the milk of healthy women was perfectly free from microbes of any kind, and the presence of germs in this fluid was considered indicative of disease. Dr. Paleske reports that in his researches he found that the milk of healthy women is often contaminated with microbes. He places the number so infected at 50 per cent. These germs, according to him, belong to the cocci order, those most prevalent being known as the staphylococcus pyogenes albus.

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MEDICAL TEMPERANCE AT THE WORLD'S FAIR.

THE Medical Temperance Congress held its sessions as announced in the program. Though the meetings were not largely attended, able speeches were made by Dr. N. S. Davis, of Chicago, Dr. J. D. Crowthers, of Hartford, Conn., and Dr. I. N. Quimby, of Jersey City. Remarks were also made by the writer. These addresses will appear in the printed report of the Congress, and hence will not be reviewed here.

A very earnest and eloquent address was delivered by the venerable Dr. Davis, who has, for so many years, stood almost alone in the profession as a champion of the cause of temperance. Dr. Davis was led, as the result of experimental inquiries undertaken by himself, to abandon the use of alcohol as a medicine more than forty years ago. Dr. Davis has, since then, been in charge of one of the largest public hospitals in Chicago, and has had, in addition, a very extensive private practice. He stated to the writer that during the last forty years he had treated 60,000 patients, to not one of whom had he administered alcohol. In Mercy Hospital, of which he has had charge for thirty years, he has within that period treated more than 1000 cases of typhoid fever, with a death rate of only 6 per cent, scarcely one third of the usual death rate when alcoholic stimulants are used. His success in the treatment of pneumonia has been equally marked, the death rate being less than half the ordinary mortality rate.

These are telling facts which ought to arrest the attention of those who consider alcohol a necessary or useful agent in the treatment of febrile maladies.

J. H. K.

MEETING OF THE AMERICAN MEDICAL TEMPERANCE ASSOCIATION.

THE meetings of the American Medical Association and the American Medical Temperance Association, recently held at Milwaukee, while not so largely attended as some have been, were exceedingly interesting. In some respects, these meetings were notable, and will mark an era in the history of both associations.

The meeting of the American Medical Association brought together leading physicians from all parts of the United States, and was also honored by the presence of Dr. Ernest Hart, an eminent English physician, known the world over as the distinguished editor of the *British Medical Journal*, the leading medical journal published. Dr. Hart gave an interesting address on cholera, in which he took the ground that alcohol must be altogether interdicted in the treatment of the disease named. His argument was that the patient suffering from cholera is already struggling with a deadly ptomaine, and that to load his system with alcohol, also a product of germ-action, and hence allied to the ptomaine of cholera, would be simply to burden the system with another toxic agent.

One of the interesting general features of the papers read in the Medical Association, was the frequent reference to the mistaken use of alcohol. There is probably no disease in which alcohol has been more frequently used, nor with greater confidence in its utility and even necessity, than in pneumonia; yet Dr. Washburne, an eminent Milwaukee physician, asserted that "the use of alcohol in

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pneumonia to avert heart failure, has been proven to be a mistake." Dr. Washburne further stated that the hospital records of the past seventy years had shown that, notwithstanding the many improvements in medical practice, the death rate of pneumonia had not decreased, but had rather increased. The statistics of the Boston City Hospital show an increase from 10 per cent in the decade from 1822 to 1832, to twenty-eight per cent in the last decade. Dr. Washburne took the ground, which is amply sustained by recent physiological researches, that alcohol is not a heart tonic nor a stimulant, but a depressing agent, and hence aids in producing the very heart failure to avert which it has been administered. It seems very remarkable that it takes so many years for medical men to discover the noxious properties of a drug possessed of such decided and evidently depressing effects as alcohol.

The American Medical Temperance Association held a very interesting session on Thursday evening. The principal feature of the meeting was an able address by N. H. Davis, which will be published elsewhere. One of the editors of this paper made a report, as a member of the Committee on Statistics, on the non-alcoholic treatment of disease, which made an excellent showing for the disuse of alcohol. A paper detailing the results of recent physiological researches relating to alcohol, was also presented. Some new and interesting facts were presented, an account of which will appear elsewhere.

The President and Secretary were instructed to arrange for the publication of a quarterly to be known as the *American Medical Temperance Quarterly*, which will constitute the organ of this association. The American Medical Temperance Association has before it a great and important work in the education of the medical profession in relation to the results of modern research respecting the physiological properties of alcohol, and the relation of these properties to health and disease.

The next meeting of the two associations will be held in California, by invitation of the California delegates.

J. H. K.

THE NEW HYPNOTISM.

An interesting discussion has recently been in progress in the London journals in which both the lay and the medical journals have joined, and which have presented in a very lucid and exhaustive way both sides of the controversy as to whether hypnotism has any legitimate place in rational medicine. Dr. Earnest Hart, an eminent English physician, in two able articles entitled, "Some Phases of Hypnotism Exposed" and "Dangers of Hypnotism," gives the results of the investigations which he has recently made in the hospitals of Paris and elsewhere, relating to the use of hypnotism in the treatment of disease. He quotes Babinski, of the Saltpetriere, who says, "Outside of hysteria there does not exist a single affection capable of being notably modified by hypnotism."

Dr. Lloyd Starr-Best, in coming to the defense of hypnotism, maintains that it is based upon physiological laws, which he states as follows:—

"The 'pabulum' of thought is sensation; without the constant rain of sensorial stimuli, intellectual activity must come to an end. Once cut the mind adrift from all impulses from the outer world, and of necessity all volitional and psychical processes soon cease. In illustration of this fact, Michael Foster adduces the case of a patient whose almost only communication with the external world was by means of one eye, he being blind of the other eye, deaf of both ears, and suffering from general anæsthesia. The moment the sound eye was closed,

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he fell asleep. . . . The general mental activity varies in the direct ratio of its external stimulus. *Again, we are only conscious of that which we attend*, attention . . . being a mental state, the spontaneous or voluntary adjustment of the mind to a particular part of its environment; and this adjustment may, as its intensity grows, become *fixed*, and so preclude the possibility of any but the most violent sensorial stimuli unconnected with the one group, passing the threshold of consciousness, although these unfelt stimuli may yet result in appropriate actions.

"Of the myriad impulses that ceaselessly impinge upon our brain, few rise to consciousness, *those only to which we spontaneously or voluntarily attend*. . . . If the attention to one idea (or group of ideas) be strained to the point of fatigue, such attention may pass altogether beyond the control of the will, the whole mind may become filled with that idea, and all sensation unconnected with it may pass unperceived — in other words, a 'cramp' of the attention ensues. . . .

"From the very earliest ages this phenomenon has been empirically known. Witness the Indian Fakirs and Yogis, the savage at the stake, the Christian martyrs, and the Omphalo-psychics of Mount Athos, who used to produce this spasm of the attention by the fixed contemplation of the navel, until they fell into the so-called 'ecstasy' and were completely shut off from the outer world. . . .

"Again, under normal circumstances, our memory of an event varies as to strength directly with the amount of attention we pay to it. . . . But in order to call up some past idea, the mind must have some present idea which is in some way allied to the past one. . . . The mental continuity must be unbroken. Now, in the case of attention strained to its highest pitch of intensity, so that there is unconsciousness of *everything* but one group of ideas, that group is totally disconnected from the normal environment, has no mental setting in that environment. One idea of the group may suggest another of the same group, but that is all. . . . Enough has been said, I think, to justify our acceptance of the following postulates: —

"1. That general consciousness varies directly with external stimuli.

"2. That general consciousness varies inversely with the attention upon one idea or set of ideas.

"3. That the attention may be so 'strained' as to pass beyond the control of the will and to destroy the general consciousness.

"4. That the attention upon one idea or group of ideas may be so great as to prevent that group from being remembered in the normal mental condition.

"For the synthesis of hypnosis let us add one other well-known and generally admitted law.

"5. That an idea tends always to generate its actuality either in sensation or action.

"What is meant by this is, that the idea of an action or of a sensation tends to result in that action or sensation, and would inevitably do so were it unchecked, uninhibited by other ideas; that the nervous processes attending the real and ideal phenomenon differ only in strength. . . . Once let an idea obtain undisputed possession of the mind to the exclusion of others, and it inevitably generates its actuality.

"Now let us treat the hypnosis synthetically, and attempt to develop it in an imaginary patient by the application of laws which govern all mental manifestations.

"First, we shut off as far as possible, impulses from the outer world. We place the patient in a position of rest and comfort, that auditory and tactile stimuli may be as small as possible, while we minimize ocular impressions by causing

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him to regard fixedly a single point of light or by closing the eyes. . . . Thought, whose very essence is the recognition of differences, is no longer stimulated by ever varying environment, the consciousness is diminished in *extent*, and the attention ready to leap forward to the operator's words or actions. . . . We attract our patient's attention, and hold it riveted by the vivid verbal development of a mental picture of sleep. As our delineation increases in vividness and emphasis, his attention becomes more and more 'cramped,' introspective criticism changes to intense conviction, as one by one suggested sensations become actual, as his limbs *do* become heavy and numb, his eyelids weary, and his brain drowsy and confused. . . . The more the patient is struck by the transference of suggested idea into sensation, the more is his attention engrossed, and, conversely, the more concentrated his attention upon the suggested idea, the more complete and rapid the transformation of that idea into its actuality. Finally, the patient's attention passes altogether beyond the power of his will. He *cannot* attend to anything but the operator's words, and is consequently unconscious of everything else."

The writer has seen something of the therapeutic use of hypnotism in the clinics of Professor Charcot at the Saltpetriere in Paris, and has watched with interest the experimentation with this form of mental therapeutics which has been going on within the last few years, but thus far does not feel justified in making any application of it. It would seem that those who are most subject to the influence of this method are persons of weak volitionary power, persons whose control of impulses and emotions — in other words, whose general volitionary power — needs to be increased rather than diminished. The impression made upon a patient by hypnotism would seem to be that his own will is weak and of little value, and that he is controlled by the will of some person of a stronger will than himself. The persons whom we saw operated upon at the Saltpetriere, were always persons of very weak volitionary power, emotional, excitable, ignorant, and superstitious. It would seem that the effect of this mode of treatment would be to increase the weakness of the will in the individual rather than to strengthen it. While it is true that symptoms may be temporarily abolished, it is equally true that the method is radically wrong, and deals only with symptoms, as does any other palliative, and does not strike at the root of the malady by strengthening the inhibitory power of the patient. J. H. K.

THE HIPPOCRATIC OATH.

We are glad to note that a few medical schools still retain the good old-fashioned practice of requiring their graduates to take the Hippocratic oath. It would be well indeed if every medical school in the country would administer this oath to its graduates, and still better for humanity if each graduate would carefully adhere to the principles enunciated by this first of medical philosophers. For the benefit of those who may never have taken the oath or read it, which, however, we hope does not include a large proportion of our readers, we here present this remarkable and most commendable expression of a physician's obligations: —

"I swear by Apollo the physician, and Esculapius, and Allheal, and all the gods and goddesses, that according to my ability and judgment, I will keep this oath and this stipulation, — to reckon him who taught me this art equally dear to me as my parents; to share my substance with him and relieve his necessities, if required; to look upon his offspring on the same footing as my own brothers, and to teach them this art if they shall wish to learn it, without fee or stipulation; and that

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by precept, lecture, and every other mode of instruction, I will impart a knowledge of the art to my own sons, and those of my teachers and disciples bound by a stipulation and oath according to the law of medicine. I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to any one if asked, nor suggest any such counsel. With purity and with holiness I will pass my life and practice my art. Into whatever houses I enter, I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption. Whatever, in connection with my professional practice or not in connection with it, I see or hear, in the life of men, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret. While I continue to keep this oath unviolated, may it be granted me to enjoy life and the practice of the art, respected by all men, in all times; but should I trespass and violate this oath, may the reverse be my lot."

Coffee for Inebriates. — The establishment of coffee houses in place of saloons, is by some regarded as one of the most important means of antagonizing inebriety. We have always been opposed to the plan of curing one evil by the substitution of another; for although the coffee drunkard may be somewhat less of a menace to the public peace, and less of a nuisance to his family, he is nevertheless a sinner against nature, and in a way to become an opium slave or a victim to some other form of narcotism.

Recent observations by Czarkowski, according to Wratch, show that drunkards, of all classes, are the least able to bear the use of coffee. As is well known, coffee contains the active principle of caffein, a vegetable alkaloid possessing very marked properties as a cerebral excitant. The authority referred to takes very strong ground upon the subject, declaring that in persons addicted to alcohol, caffein is strictly contra-indicated. He observed that as a result of the use of caffein in medicinal doses, violent cerebral agitation appeared, giving place to the reverse condition, — one of extreme sadness, as soon as the caffein was withdrawn. In one case, there was not only extreme cerebral agitation, but also fright, followed by a loss of consciousness which lasted several hours. In still another case, a most violent delirium, in which the patient manifested decidedly destructive tendencies, was induced by caffein.

J. H. K.

Cutting off Supplies. — The eminent Dr. Tronchin, of Paris, considered abstinence from food as the best of all remedies for disease, probably because he regarded most disorders as the result of overfeeding, a conclusion in which we heartily agree, at least if bad feeding is included. "Good generals," said Dr. Tronchin, "always attempt to cut off the enemy's supplies. I put my patients on spare diet at once, and bring the enemy to terms by famine." The great Napoleon seems to have had the same idea. "When I am not well," said Napoleon, "I fast, bathe, and rest. If I am taken sick while I am resting, I exercise. If taken ill while hard at work, I rest; but in all cases, I fast. I find that is all I need."

Origin of Hot-Water Drinking. — The famous Dr. Sangrado, of whom the original was Dr. Philip Hecquet, who was born in the latter part of the 17th century, seems to have been the originator of hot-water drinking. Dr. Hecquet was a great advocate of bleeding and copious hot-water drinking. He was also rigidly abstinent. For the last thirty years of his life, he neither ate meat nor drank wine.

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REVIEWS.

Book on the Physician Himself.— By D. W. Cathell, M. D., Philadelphia, Pa. The F. A. Davis Co., publishers.

This work is already so well known to the profession that it is hardly necessary to undertake anything like an extensive review of it. The work is full of just such good advice as any intelligent and sensible physician would be glad to have; and no physician, no matter how extended his experience, can read the work without interest or without profit. The author is a man of highest reputation and character, and one whose long and successful experience in the profession renders him thoroughly competent to write upon such a theme as he has chosen.

This work, although not long before the public, has already reached its tenth edition, which is in itself ample evidence of its value and popularity.

Colpo-hysterectomy for Malignant Diseases; Diagnosis, and Some of the Clinical Aspects, of Gyroma; Endothelium of the Ovary; Microscopical Studies in Pelvic Peritonitis; and Carcinoma of the Floor of the Pelvis in Women. — These five papers, by Mary A. Dixon Jones, M. D., Surgeon to the Brooklyn Hospital for Women, Brooklyn, N. Y., are all practical and valuable contributions to medical science. Dr. Jones is unquestionably the leading lady surgeon of the United States. A pupil of Lawson Tait, she has followed in his footsteps, and has, by interesting microscopical studies, developed some very valuable facts respecting the causes of ovarian suffering in women, and in explanation of the anomalous appearance frequently found in the ovaries of women who have long been the subjects of what has been termed chronic ovarian irritation, inflammation, or congestion.

Dr. Jones is entitled to the thanks of the profession for her fruitful labors in this direction, the value of which must be recognized by every laparotomist who has removed any considerable number of diseased ovaries.

A Practical Treatise on Materia Medica and Therapeutics.— By J. B. Shoemaker, M. D. The F. A. Davis Co., Philadelphia.

Dr. Shoemaker is a profuse and always interesting writer, contriving to impart to his readers or hearers much of his own enthusiasm. He is evidently a diligent student also. His work fills a useful place in bringing up to the latest date some of the more recently developed therapeutic measures. Especial attention is given to pneumo-therapy, electrotherapy, and a small and by no means adequate space is devoted to hydrotherapy. The work is one which ought to be in the library of every physician, since it contains many interesting suggestions which will not be found so conveniently presented in any other volume. The work is in two volumes. Volume I contains 353 pages devoted to pharmacy, general pharmacology, therapeutics, and remedial agents not properly classed with drugs. Volume II contains 680 pages, and is an independent volume relating to drugs. The price of Vol. I, cloth, $2.50; sheep, $3.25. Vol. II, cloth, $3.50; sheep, $4.50.

Extra Abdominal Intestinal Surgery.— By Waldo Briggs, M. D., St. Louis, Mo.

This is a little paper explaining a new method of procedure in intestinal surgery. The method proposed is an elaboration and extension of a method suggested by Tait, Gregg Smith, and others, and consists in not only bringing the wound of the intestine into the wound in the abdominal wall, but in maintaining the intestine outside the abdominal cavity for a few hours, so that it can be watched,

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until the union has taken place. The author covers the line of union with an asepticised animal membrane, which seems to be quickly incorporated with the peritoneum. Within from six to eight hours after the operation, the intestine is put back into the abdominal cavity. We are impressed with the idea that the method suggested by Dr. Briggs is a notable improvement in intestinal surgery. It is certainly worthy of careful trial.

Hydrotherapy at Saratoga. — By John A. Irwin, M. A., M. D. Cassell Publishing Co., New York.

In this work the author has undertaken to place upon a scientific basis the use of the mineral waters of Saratoga, not only with reference to their mineral constituents, but with reference to the physiological effects of the water as water, independent of any substances which it may hold in solution. The book contains, in addition to information about the Saratoga waters, much interesting and useful information concerning the waters of European springs, and of hydrotherapy in general. All visitors at Saratoga who anticipate resorting to the use of the mineral waters for which that place is celebrated, should possess themselves of a copy of this book.

The Sympathetic Nerve and Abdominal Brain in Gynecology, Its Reflexes and its Rhythm; Peritonitis. — By F. Byron Robinson, B. S., M. D., Chicago, Ill.

These are two excellent papers by a careful observer. The paper relating to the sympathetic nerve and abdominal brain in gynecology is a very important one. The writer has been making observations in the same line for a number of years, and finds in his own experience abundant confirmation for most of the views advanced.

The interesting observations made by Trastour respecting the influence of traction upon sympathetic nerves in cases of enteroptosis or prolapse of the abdominal viscera, are probably not unknown to the author. Trastour's observations are certainly in harmony with the results which Dr. Robinson has so carefully worked out, and which are worthy of careful study by all gynecologists.

The Wife and Mother: a Medical Guide.— By Albert Westland, M. D. P. Blakiston, Son & Co., publishers, Phila.

This is an American reprint of an English work, which, as the author says, "is addressed to women who are desirous of fulfilling properly their duties as wives and mothers." This work contains a great amount of interesting and really valuable information. The statements of the author are concise and clear, and are, as a rule, free from technicalities.

The Mediterranean Shores of America, Southern California, its Climatology, Etc.— By P. C. Remondino, M. D. F. A. Davis Co., publishers, Philadelphia, Pa.

This work is written in Dr. Remondino's characteristic and interesting style, and contains the most complete and reliable information upon the subject of which it treats. Every person who is interested in the climatology of the Pacific Coast should possess himself of a copy of this book. It is well illustrated, and is not simply a collection of dry statistics, but is a volume which will be likely to be read through, if once begun.

The Daughter — Her Health, Education, and Wedlock.— By Wm. M. Capp, M. D. F. A. Davis Co., publishers, Philadelphia, Pa.

This work is not a compendious treatise, but is a little volume brim full of good suggestions of interest to mothers, daughters, and in fact to every member of the household. Every mother in the land might read it with profit.

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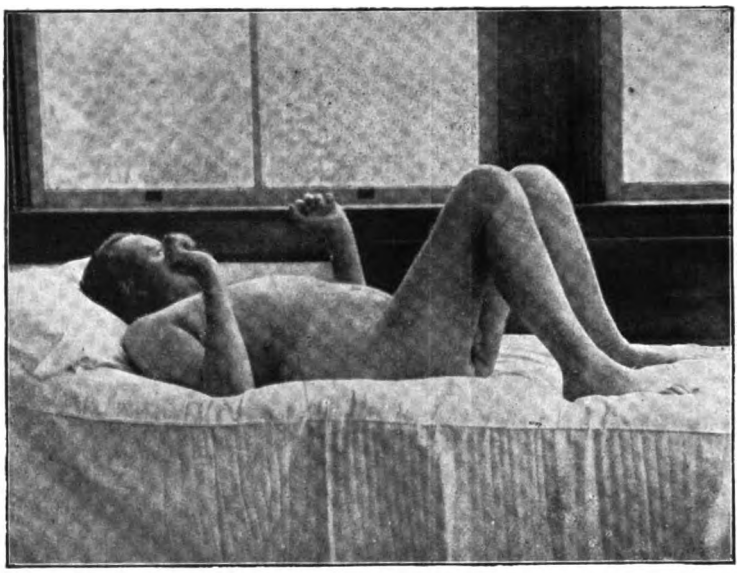

FIG. 6.

FIG. 6.

Position of Case II before treatment. Patient entirely helpless. Paralysis of upper and lower extremities, with contracture of unopposed muscles; mental derangement. (See "Report of Three Cases of Multiple Neuritis," p. 165.)

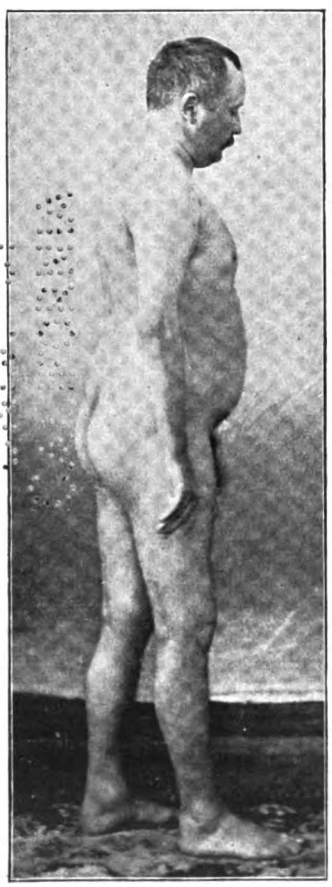

FIG. 9.

FIG. 9.

Natural position of same patient after treatment. Able to exercise two hours daily; mind normal. (See page 167.)

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MODERN MEDICINE

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BACTERIOLOGICAL WORLD.

VOL. II. BATTLE CREEK, MICH., U. S. A., JULY, 1893. NO. 7.

REPORT OF THREE CASES OF MULTIPLE NEURITIS.

BY W. H. RILEY, M. D.

Sanitarium, Battle Creek, Mich.

(Concluded.)

CASE II.

Mr. B., aged ——, American by birth, a grocery and saloon keeper by occupation, came to the Sanitarium for treatment for "paralysis," and gave the following history : —

The patient had been addicted to the use of alcoholic liquors for some years ; but during the last two or three years, had been drinking whisky rather excessively, being in the habit of drinking daily, but was seldom intoxicated. For some time previous to his present trouble, he had been working out of doors in the sun, and was exposed a great deal. About four months before coming under my observation, he noticed a numbness and sometimes a burning and prickling sensation in his hands and feet. These sensory symptoms continued for several weeks before the disease manifested itself by more decided symptoms. About twelve weeks ago, after overwork and exposure to heat and sun, he was taken sick with dizziness and vomiting, and could not see well. At times, things appeared black before his eyes. He also suffered from mental weakness and confusion and loss of memory. The numbness, burning, and prickling sensations, which had appeared several weeks previously in his hands and feet, had continued to this time, and were now even more prominently present than before. The muscles soon became very sore. Muscular weakness increased. He was soon unable to stand on his feet or use his hands, and was obliged to take his bed. He remained in bed ten weeks previous to his arrival at the Sanitarium, with no improvement. His condition on entrance is indicated in the following report of ——

EXAMINATION.

1. *Motor Symptoms.*— The patient is totally helpless ; cannot stand at all on his feet ; is unable to move his hands ; cannot feed himself ; remains in bed all the time ; unable to get out of bed even to evacuate the bowels and bladder. The paralysis of certain muscles in the arms and legs, the contraction of unopposed antagonistic muscles, the severe pains and soreness of muscles, have all contributed to cause the patient to occupy a certain position while lying, illustrated in the accompanying cut taken from a photograph. (See Fig. 6, frontispiece.) The patient maintains this position constantly. He cannot straighten his legs himself, nor can they be straightened by applied force ; he holds his hands in the position shown in the photograph, on account of the paralysis and soreness of the muscles. He can do nothing for himself. The flexors of the legs are contractured, which keeps the limbs in the position shown in Fig. 6. The weakness of the muscles in the extremities is greatest below the elbows and below the knees. The knee-jerk is absent in both legs ; the abdominal and cremasteric reflexes are present. The faradic irritability of the muscles is very much decreased, no contractions at all being produced in some of the muscles with a very strong current. The galvanic irritability of the nerve is also decreased, and the galvanic irritability of the muscles in front of the leg and the smaller muscles of the hand and forearm is increased. It requires a weaker galvanic current to produce contractions in these muscles than in health. With the galvanic current, the anodal closure contraction approaches the cathodal closure contraction in these muscles. The reaction of degeneration is present.

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Sensory Symptoms.— There is anæsthesia to touch and temperature in the

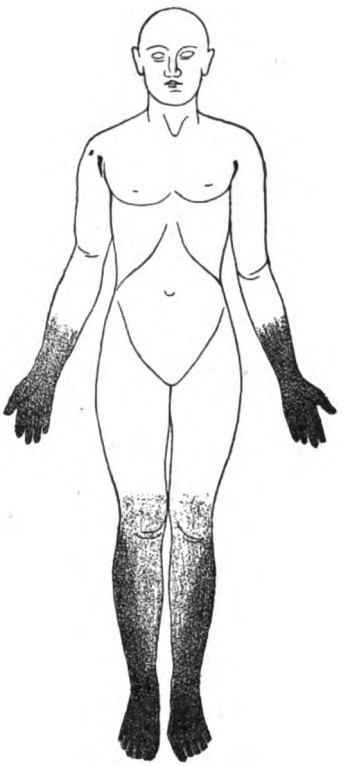

Fig. 7. Areas of Anæsthesia in Front in Case II. Degree of anæsthesia is indicated by the degree of shading.

upper and lower extremities. The area and extent of the anæsthesia is indicated by the shading in Figs. 7 and 8. In that part of the figures where the shading is deepest, the anæsthesia is complete. The lighter portion of the shading indicates a partial loss to the sensation of touch and temperature. (This case differs from the foregoing in that all the nerves of the skin in the periphery of the extremities are the seat of marked sensory disturbance, as is shown in Figs. 7 and 8. In Case I, the disease selected some nerves and left others.) The muscles are extremely tender and sore. The limbs cannot be manipulated without producing severe pain, and any movement of the limbs has to be done with the greatest care in order to avoid severe pain.

Trophic and Vasomotor Symptoms.— The muscles of the upper and lower extremities are wasted and flabby, and have lost their natural tone. The wasting of the muscles is greatest in the hands and feet. Hands and feet are clammy, and perspire freely. The fingers are pointed, and the finger nails glossy. Vasomotor symptoms are prominently present in this case. The hands and arms below the elbows, and the feet and legs below the knees, have a decided cyanotic appearance, and the extent to which the disease has affected the vasomotor nerves can be clearly seen on the limbs by the discoloration of the skin. There is also a slight eruption over the anæsthetic area.

Mental Symptoms.— The mental symptoms in this case are very prominent, and form an important part of the picture of the disease. The patient is very talkative; his mind is wandering and weak; he talks incoherently; is extremely forgetful, especially of things that have happened recently. He forgets that his physician has seen him five minutes after the physician has left the room. At times he is irritable and delirious; is constantly asking his nurse to remove something from his feet and hands when

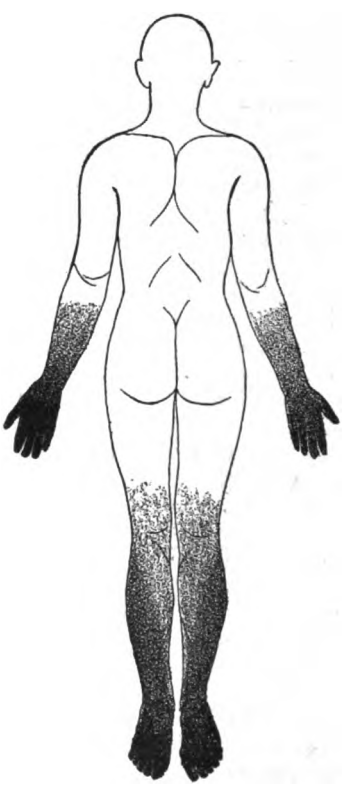

Fig. 8. Areas of Anæsthesia Behind in Case II. Degree of anæsthesia indicated by the degree of shading.

there is nothing on them. He often thinks he has socks on his feet and

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gloves on his hands. (These delusions of sensation and forgetfulness of mind are usually prominent mental symptoms in cases of multiple neuritis due to alcohol. The fact should also be emphasized that these mental symptoms have been present from the beginning of the disease, and were not due simply to acute intoxication.) The disease has in this case affected the pneumogastric nerve, which is the cause of an irritable heart and a rapid, weak pulse; the pulse is 100, and sometimes 110. The temperature is slightly above normal, 99.5°. The patient was put on the following treatment: —

Treatment. — A very important part of the treatment of this case is a removal once and forever of the cause — alcohol. The patient was put in the care of a well-trained nurse, and brought under proper mental and moral influences. Hot blanket packs to the legs, hands, and arms, one hour, twice daily; galvanism applied to arms and legs twenty minutes twice daily; passive extension of limbs daily; and cotton packs on hands and arms, below the elbows, and legs and feet below the knees, to be worn all night, constituted his treatment. This treatment was continued for one month. By this time he was able to sit up alone, and an electric light bath was ordered once a week in addition to the above treatment. Instead of giving galvanism to his arms and legs daily, it was reduced to three times a week, and on alternate days the faradic current was applied. The severe pain and much of the soreness of the muscles had by this time disappeared. The patient was able to move his hands and fingers slightly, and straighten his legs in bed. His mind was stronger, and his mental wanderings and forgetfulness were less noticeable.

Two weeks later the treatment was changed as follows: Hot water bath to hands and arms, feet and legs, for one hour daily; a light massage to arms and legs, with passive extension of the limbs daily. The wet cotton packs were continued at night. The galvanic current was applied to the muscles of the legs and arms, that were wasted and that would not respond to the faradic current. Where contractions could be developed with the faradic current, in the muscles of the extremities, it was used. The galvanic and faradic currents were used daily. At this time, also, light exercise in the gymnasium was ordered, and the patient took outdoor rides daily.

At the end of two months the patient was able to use his hands and fingers, and did some writing. By the aid of a walking machine, which partially supported the weight of the body at the shoulders, he was able to make a circuit of the gymnasium. His temperature was now normal; pulse, 80. Two weeks later he was able to bear the weight of his body on his legs without support, and take a few steps alone. There was still some soreness and tenderness of the muscles of the calves of the legs, the feet, and the hands, but the severe pains had disappeared. Another two weeks passed, and the patient was able to walk five rods alone. His legs were now entirely straight. The "blueness" of the legs and hands, which was due to vasomotor disturbance, was all gone.

Especial attention was now directed to proper and sufficient exercise to develop the weaker muscles. The improvement of all the symptoms continued. He remained under treatment about five months, at the end of which time he was able to walk two hours daily, but was obliged to rest at intervals. There was still a weakness of the smaller muscles of the hands and feet, which was greater than in the other muscles of the limbs. With the exception of slight soreness in the hands and feet, the sensory symptoms were absent. The mental symptoms of forgetfulness, delusions of sensation, weakness of mind, etc., which had been so prominent at first, and which had continued for some months, were now entirely absent. The patient was entirely relieved of the general prostration and exhaustion. He had gained several pounds in weight. His pulse was regular, and beat 72 times per minute, sitting.

The natural position of the body while standing is shown in Fig. 9, taken from a photograph. (See frontispiece.) This, when compared with condition of the patient at the beginning of treatment, shown in Fig. 6, presents a decided contrast.

CASE III.

Mr. C., a merchant, aged 35 years, on entrance for treatment, gave the following history: —

The patient has always enjoyed good health up to the beginning of the present

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trouble, which was three months ago. His disease developed suddenly with fever, temperature 103° F., vertigo, and digestive disturbances. He was obliged to use a catheter at the beginning of the trouble, for a day or two only. The fever, with accompanying symptoms, lasted a week or two, and then disappeared. In a few days from the onset of the disease, he noticed a numbness in his feet and hands, which traveled upward in both the upper and the lower extremities. Along with the numbness was also developed a weakness in the upper and lower extremities, and a general feeling of prostration. These motor and sensory symptoms increased, reaching their height at the end of two weeks, and continuing with little or no improvement until the patient came under my care.

EXAMINATION.

Motor Symptoms.— The patient goes about in a wheel-chair; cannot bear the weight of his body on his legs without support. In attempting to walk, his movements are ataxic and incoördinated. He cannot stand still with his eyes open, much less with them closed. Knee-jerk is absent in both legs. There is also considerable weakness in the upper extremities, especially in movements of the hands and fingers. Faradic and galvanic irritability of muscles but little if at all diminished.

Sensory Symptoms.— Partial loss of sensation in the upper and lower extremities; various paræsthesia in the upper and lower extremities; muscular sense much diminished; has a feeling of general weakness and prostration; dull, aching pains in the muscles of the legs; muscles tender and somewhat sore; also sharp, shooting pains at times in the limbs.

Vasomotor and Trophic Symptoms.— The patient complains of cold hands and feet; has a clammy, cold perspiration on his feet and hands; muscles soft, flabby, and wasted. He has lost several pounds in weight since the beginning of the trouble.

Treatment.— Mild exercise by walking a few steps daily, gradually increased; heat applied to spine continuously for one hour daily; hot blanket packs to legs one hour daily three times a week; galvanism to spine, arms, and legs daily; general applications of the faradic current and massage three times a week, was the treatment given. Under this treatment the patient began immediately to improve, and by the end of one month was able to walk ten rods with a cane. His gait in walking closely resembles that of locomotor ataxia. The treatment was continued two months longer. By this time the patient could walk a mile easily without a cane, or without becoming fatigued. He had gained in weight; the anæsthesia and pain in the limbs were all gone. The muscular sense, however, had not returned to the normal condition, as there was still some ataxia in the movements of the lower limbs. The general feeling of weakness and prostration had entirely disappeared. Later the patient returned for treatment, and the ataxia in the legs gradually disappeared.

The three above cases are illustrations of multiple neuritis in its most severe form. Case II is a typical case of multiple neuritis caused by alcoholic poisoning, with motor, sensory, and mental symptoms all prominent. The motor symptoms, however, predominate over the sensory, and for this reason this case, as do most others due to alcoholism, belongs to the *motor type* of this disease. In Case III the difficulty in walking was not entirely due to weakness of the muscles, but largely to a lack of coördination of movement. This case illustrates another form of the disease, namely, the *sensory type*. It has received the name of *pseudo-tabes*, from the fact that it is often mistaken for tabes dorsalis.

In Case II the cause is clearly alcoholic poisoning. In Cases I and III the causes are not so clear, as nothing definite on this point could be determined from the patient. In Case I, however, arsenical poisoning was strongly suspected. The severe nausea and vomiting, the "soreness of the throat," and gastro-intestinal disturbance, followed by the prominent nervous symptoms, make one strongly suspicious of this as a cause. Other cases might be reported, with equally good results.

The causes that usually produce the disease in this country may be briefly stated as follows:—

1. Toxic: (A) Metallic poisons, as arsenic, lead, silver, phosphorus, and mercury. (B) Non-metallic, as alcohol, bisulphide of carbon, illuminating gas, ergot, etc.

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2. Toxæmic, due to some virus in the blood, which may be an organism or the product of an organism. Under this head come the infections of diphtheria, typhoid fever, puerperal fever, and other septic fevers, phthisis, syphilis, and other sources of infection. Under this head may also be mentioned the morbid blood states in rheumatism and diabetes.

Perhaps it is hardly necessary to call attention to the fact that multiple neuritis is an organic disease, a disease in which there is destruction of nerve tissue, the nature of the morbid process being inflammatory and degenerative. Changes are always most marked in the peripheral distribution of the nerve branches which are the farthest removed from the nerve cells, the source of their nutrition, and hence have least resistance to poisons which are usually the cause of this disease. It is for this reason that the symptoms of multiple neuritis are most marked in the arms below the elbows, and in the legs below the knees. When this disease is cured, it is only by the growth of new nerve fibers in the place of those degenerated; and any treatment favoring this process is in the right direction. Whether this takes place by the development of new axis cylinders and medulary sheathes from neuclei in the old sheath of Schwann, as held by Neumann, or by a growth of new axis cylinders outward from the undegenerated part of the old fibers, as taught by Ranvier, we are not at present able to state.

The general plan of treatment as usually followed by the writer may be briefly summarized as follows: —

Remove the cause as far as possible. Cases that are due to alcoholism need restraint, and need to be brought under proper moral influences. The nutrition of the patient needs to be looked after carefully, and aided by a wholesome and nutritious dietary, plenty of outdoor air and sunshine, and a sufficient amount of sleep. In the early stage of the disease, complete rest should be strenuously enforced. To remove the poisons and effete matter that are apt to be in the system, nothing is better than drinking freely of water, which may be taken hot or cold. This also favors nutrition, and helps to regenerate the nervous tissue which has been destroyed by disease. This should be continued throughout the course of the treatment. In the early stage of the disease, also, the application of heat *continuously* from one to three hours daily by hot blanket packs, or hot water baths at a temperature from 105° °to 108 F., and not carried to the point of exhaustion, should be made to the upper and lower extremities. Moist cotton packs applied to the arms and legs should be worn all night.

Later, in addition to the above, I employ galvanism. Labile uninterrupted applications should be made daily, each application lasting twenty minutes. The positive pole should be applied to the seat of the disease in the limbs, and a large electrode attached to the negative pole should be placed at some indifferent point of the body, as at the lower spine or over the abdomen. When the pain and soreness have left the muscles, massage and the faradic current should be substituted for the hot applications which were used in the earlier stage of the disease. Later, systematic exercise should form an important part of each daily program. The manner of treating patients on "general principles," and prescribing faradic electricity and massage simply because the patient is "paralyzed," in the early stage of multiple neuritis, often does more harm than good.

FACTS AND DOUBTS ABOUT CHOLERA.

BY L. BREMER, M. D.,
St. Louis, Mo.

(*Concluded.*)

THE great obstacle in the way of gaining definite and incontrovertible knowledge on this point is, that there is no animal which either spontaneously or artificially can be said to be attacked with true Asiatic cholera; and that therefore the most important link of the chain of evidence, as formulated by Koch, for the demonstration of specific bacteria, namely, the production at will of an infectious disease by a pure culture of the respective bacterium, is still missing in the study of cholera.

The experiments performed so far have, it must be admitted, yielded results, recalling in a measure choleraic infection in guinea-pigs and dogs, for

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instance; but the conditions under which the disease, *i. e.*, a violent intestinal catarrh with copious serous exudation, took place in animals experimented upon, bore no resemblance to those conditions under which cholera takes place in man. If, for example, the intestine of an animal is first bruised, or the common bile duct is tied, or opium is administered, or large quantities of alcohol are ingested, or the stomach is rendered alkaline, before introducing the cholera virus, it is clear that these conditions differ widely from those that nature presents; and whether successful or unsuccessful, such experiments are only of relative and conditional value, especially since other bacteria besides the cholera microbe have been demonstrated to possess the same deleterious action on the animals under like conditions.

Our chief source, then, of information about the cholera process will be, as heretofore, clinical and anatomo-pathological evidence. And what does this teach? The symptoms, as well as the post-mortem finding, point to an intense poisoning process. Indeed, unless an epidemic is plainly established, it is very difficult, and often impossible, to make a differential diagnosis between the symptomatology and (I have no doubt under certain conditions) even the morbid anatomy, of poisoning by arsenic, *e. g.*, and other substances, without a concomitant bacteriological examination. The only man capable of diagnosing positively a case of cholera when he sees it, and to whom bacteriology seems to be a superfluous adornment to medicine, is a "cholera expert" at present in the service of the government. If the papers have correctly reported, he deemed a bacteriological examination useless after he had made the clinical diagnosis.

To revert to our subject. The resemblance to a poisoning process is due, according to Koch and most of the modern observers, to a specific putrefactive process in the upper part of the small intestines, the chemical product of which has the power of causing, when absorbed into the circulation, the dreaded and notorious nerve symptoms, and anatomically producing a necrosis of the epithelia of the intestines as well as of the secretory organs, especially the kidneys, in consequence of which anuria results. Some, however, believe that the grave nervous symptoms are not caused by any cholera toxines, generated as metabolic products by the specific bacteria, but that those symptoms are due to inspissation of the blood by the excessive loss of water, the blood retaining all the offal products generated by the fever and the ordinary wear and tear of the body; while still others are of the opinion that the cadavers of the cholera vibrions, their decomposition and the absorption of the products of this decomposition respectively, are responsible for the symptoms of the choleraic attack.

Very naturally, a number of investigators went to work to extract and isolate the supposed poisonous substance. The results have been far from harmonious, which is perhaps due to the fact that the bodies purported to be cholera toxine, were obtained under different conditions of virulence; some, no doubt, from the absolutely harmless microbes that had grown in a liberal supply of oxygen. All of the toxines, however, obtained by the various experiments of Brieger, Villier, Pouchet, Klebs, and others, when injected into animals, produced some, but not all, of the symptoms of cholera, principally paralysis and tremor. There is, however, at present too much discrepancy in the results to attach any great importance to any of them; and although poisonous substances have been obtained from cholera vibrions cultivated in eggs, with the above-mentioned result of increased virulence, it cannot be said that the cholera toxine has been discovered. Here, too, science is still in the dark.

I have in the preceding remarks touched only a few of the mooted points in the cholera question. Of course there are a great many more, and the farther science advances and the deeper the human mind penetrates into the mysteries of nature's workshop, the more riddles will present themselves for solution in this as in other branches of the natural sciences.

In consideration of these many harassing doubts and balking uncertainties, it is refreshing to see how some writers inside and outside the profession, especially the latter, seem to know all about the cholera, even its prevention and cure. The charming positiveness with which such authorities as Edwin Arnold pronounce themselves about the effects of quarantine and hydrochloric acid, is

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quite a relief from the depressing consciousness of the often mentioned doubts and uncertainties. Unfortunately it is only the most ignorant in medical, as in other matters, that are the most positive in their assertions; and literateurs in particular have, ever since the illustrious examples were set by such men as Goethe and Carlyle, the uncontrollable impulse, when giving their opinion of medicine and doctors, to bring to the surface a portion of that asininity which lurks in the composition of the average man.

Sea-quarantine, whatever may be its inconvenience, seems to be a success, especially in the light of recent events; and if it should prove only a partial one, and cholera break through the barriers after all, it will be a success. Time gained, everything gained, is the parole in the present epidemic, when winter is near at hand.

Whether it is a wise plan to take hydrochloric acid as a prophylactic, should cholera make its appearance, is to my mind very questionable. Many persons do not bear it; it produces catarrh of the stomach in some, and aggravates existing ones in others, while in still others it has the well-known curative effect.

Should one drink the pure waters that are advertised as germ-free in case cholera should come to us? — Yes, provided they are boiled, when they may prove as good as our Mississippi water after having gone through a similar process.

It is a laudable and eminently proper undertaking that all over the country intelligent citizens are forming committees for the purpose of improving the sanitary condition of their cities. St. Louis has perhaps the best sanitary advantages of any of the large cities, the world over. If these advantages are rightly comprehended and utilized, the danger of a possible cholera invasion seems minimum. But there is a standing menace to the health and fair name of our city in case a serious epidemic of any kind should break out.

Time and again our city hospital has been branded by the daily press as a nuisance, and stigmatized as a burning shame on a rich and powerful commonwealth like ours, and I am afraid that, in case of an epidemic, whose danger is not by any means removed as yet, the scenes of horror witnessed in the hospitals of Hamburg would not only be duplicated, but thrown in the shade. The condition-then, of that institution, on whose ca, pacity and efficiency would above all depend the success or failure of barring and crushing out the invading enemy, an institution about whose inadequacy all the succeeding superintendents of the last twenty years have in vain complained, ought to receive the attention of those who, in spite of magnanimity, have taken upon themselves the *Ne quid detrimenti respublica capiat.*

The discouraging report of the Hamburg epidemic shows that, when once established, cholera generally braves all remedies, inoculation included. This should be an extra stimulus to work in the proper direction.

A CASE IN WHICH THE TAPELINE SHOWS IMPROVEMENT IN CONDITION BY EXERCISE.

BY HENRY CLARK, M.D.

THE case mentioned in the paragraphs following derives its interest from the circumstance that the improvement made has been registered in tapeline values. The patient was, during the time cited, under the care of a gymnastic director. I knew the man by a former acquaintance with him. His measurements were first taken by the director and after awhile by myself, as a test of what results had been reached. I cannot make an exhaustive report on the subject, but as the patient was early a subject of mine, I have much knowledge of him. "M" was, I presume, a dyspeptic, well enough to be about some business, yet not in a condition to enjoy what he had to do.

FROM SEPT. 2, 1892, TO FEB. 2, 1893, 5 MONTHS.

"M" has been having general gymnastic exercise, and says he feels much better for it. It includes what is ordinarily given to his pupils by this trainer, so far as I know; *i. e.*, the so-called machine-work of every kind; the stretch of the shoulders, in diagonal parallel bars, on pull-down horizontal-bar to chest, and to feet; the "quadrant;" the rowing-machine; pull-weights, with a bath and rub-down after exercise; 20 impulses in each exercise with light weights, about

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half the average weight used by other men.

Schedule of dimensions No. 1 (on beginning his training).— Weight, 126 lbs.; stature, 68¾ in.; neck, 13 in.; right shoulder, 15½ in.; left shoulder, 15 in.; circumference around shoulders, 38¾ in.; chest, natural, 33 in, expanded, 34 in.; waist, 28½ in.; hips, 34 in.; right thigh, 18½ in.; left thigh, 18½ in.; right calf, 13½ in.; left calf, 13½ in.; right bicep, 10 and 11 in.; left bicep, 10 and 11 in.; right forearm, 9¾ in.; left forearm, 9¾ in.

Schedule No. 2 (after five months' exercise.— Weight, 127½ lbs.; stature, not observed, presumed to be unchanged; neck, 13½ in.; right shoulder, 16½ in.; left shoulder, 16½ in.; circumference around shoulders, 38¾ in.; chest, natural, 33¼ in., expanded, 33½ in.; waist, 29½ in.; trochanters (answering to "hips" in preceding dimensions), 34½ in.; right thigh, 19½ in.; left thigh, 19⅜ in.; right calf, 13 in.; left calf, 13½ in.; right bicep, 10⅞ and 11⅛ in.; left bicep, 10 and 10¾ in.; right forearm, 10⅛ in.; left forearm, 10½, in.

In schedule 1 the girths of calf and neck 13, 13½ are so similar in value as to indicate a not unevenly developed man, as to proportion between upper and lower half. He appears to the eye rather slight than full in his make-up, rather thinner above than below the waist, as compared with good men. His dimension "hips" is, as far as learned, taken at about the same level as the dimension "trochanters," which is the girth around the trochanter-major, on the level of the swell of the buttock, and this value shows the comparative vigor of the patient as indicated by his ability to stand up on his feet. He stands well.

Now as to his general improvement; it may be seen, on comparing the two schedules, that he has gained in weight from 125 to 127½ lbs., or 2½ lbs. This extra weight, by inference, is distributed quite evenly. There is a gain in neck of ½ in.; right shoulder, 1 in.; left shoulder, 1½ in.; chest, ¼ in.; waist, ¾ in.; hips or trochanter girth, ½ in.; thighs, about 1 in.; forearms, about ¾ in. As to the significance of this actual gain, we have less play of chest (¼ instead of 1); and this gives me opportunity to mention a singular phenomenon following vigorous and persistent exercise. My own observation shows that the value "play of chest" will always decrease when a man has exercised for some time in a gymnasium; a result, I suppose accounted for by the lessened elasticity of the pectoral muscles, or of those muscles which resist the respiration. That the extra girth is small is accounted for by the fact that only a real building up increase is to be expected in this case, since the patient has gained his growth, being twenty-four years old this year.

While it is not possible in every example to compare ordinary growth, as indicated by the tapeline, with development under exercise, it is fortunately so in this case, as I have before me now the notes I made in 1884, when the lad was fifteen years of age.

Schedule No. 3, Dec. 12, 1884.— Weight clothed (from his own recollection) subtracting 7 lbs. for clothing, net, 103 lbs.; stature, approximately, 66 in.; chest, 30½ to 31¾ (play 1¼) in.; trochanter girth, 32 in.; right thigh, 18 in.; right calf, 13 in.; left calf, 13 in.; right biceps, 10 in.; left biceps, 9½ in.

Here are the dimensions of a lad somewhat debilitated, and in not so good condition as at the latest examination, since he had then gained some energy by his training. But the changes, compared with the latest schedule, show a gain of 23 lbs. in weight; in stature, 3¾ in.; in neck girth, 1 in.; chest, 2¾ in.; trochanters, 2½ in.; thigh, 1½ in.; calf, none, right biceps, none. He therefore gained the most in stature, chest, and trochanters. It is to be regretted that we have not yet learned just what the particular changes are which occur in the growing boy as he reaches puberty. I have several very interesting values at a later period, for several cases which boys have been willing to give me opportunity to attain, yet none, unfortunately, which furnish exact answers to this question.

Reviewing these figures once more, we find ourselves certified of a few facts: 1. That the growing boy in gaining young manhood grows taller and somewhat thinner proportionately; 2. That in some lines of development, growth gives much more variation than exercise; and 3. That judicious building-up exercise should be light in order to give a better condition. It can then be depended on for the best results.

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SURGICAL SIGNIFICANCE OF DUST.

DURING the first years of the antiseptic era, the atmosphere was held responsible for many of the septic conditions developed in wounds which we have since learned to attribute to other causes. In those times, no operation, however trivial, was undertaken without the use of the spray, and the utmost attention was paid to keeping the wound protected from the air. The perfection of our antiseptic technique and the excellent results of the septic method have served to relegate the doctrine of air infection to the background, as is evidenced by the almost universal abolition of the spray during surgical operations. Thanks to the advance made in bacteriology, it is now recognized that the sources of wound infection are far more often to be sought in neglect of cleanliness, unclean hands and instruments, and improperly prepared dressings, than in an impure condition of the atmosphere. In other words, the doctrine of direct contagion has supplanted that of infection through the air. It cannot be denied, however, that the condition of the air in operating rooms and sick chambers exerts some influence upon the healing of wounds; and it will, therefore, be of interest briefly to review the results obtained by Dr. Carl Hægler (*Beitrage zur Klinischen Chirurgie*, Bd. 9, 1892), who has made the question of aerial infection the subject of an elaborate bacteriological investigation. The stimulus to undertake this extensive work was furnished by two cases of erysipelas, for which no cause save aerial infection could be assigned. An examination of the air and dust of the ward occupied by these patients revealed a number of pathogenic organisms, chiefly staphylococci and streptococci, the virulence of which was shown by inoculation experiments on animals. Want of space forbids us from going into the details of the author's subsequent investigations of the air of operating theaters, hospital wards, lecture rooms, laboratories, etc., which were undertaken with extreme care. In all these places, pathogenic microbes were found in comparatively large numbers, and in view of this fact, Hægler concludes that the air must be considered as one of the factors of wound infection, although not a prominent one. The manner in which these organisms are disseminated in the air is not difficult to understand. Staphylococci and streptococci occur in normal saliva and nasal mucus, and by spitting and sneezing become mixed with atmospheric dust. They are found on the superficies of the body, in the normal urethra, in the finger nail dirt, etc. They reach the air, however, in far larger numbers from the surface of suppurating wounds or dressings which have been in contact with them.

Since the dry aseptic method of wound treatment has come into vogue, and moist dressings are less employed, the danger of admixture of pathogenic organisms with atmospheric dust is greater than formerly, owing to the fact that during the removal of the dry dressing, particles of desiccated pus are frequently carried into the air, while this is less likely to happen if the wound be kept moist. Although these sources of atmospheric contamination are acknowledged by many authorities, most of them assume that the organisms are so rapidly destroyed in the atmosphere that they cannot prove injurious. Hægler's experiments show, however, that streptococci and especially staphylococci preserve their vitality for a long time in the air in a dry state. He remarks that atmospheric infection frequently becomes a contact infection, the germs falling into the wound from the air, the hair, and the clothes of the operator and assistants, and being rubbed into the tissues by instruments, sponges, etc.

From his experiments the author deduces the practical conclusion that a thorough moistening of the air with steam — not by an atomizer — frees it almost completely from microbes within a comparatively short time; and that wetting the floor, walls, and furniture of the room prevents a fresh contamination of the air. The time required to purify the air will depend upon the rapidity with which the room can be filled with steam. During removal of dressings, especially if they be dry, there should be as little movement in the room as possible, so as to avoid stirring up dust. If dry dressings have been employed, they should be moistened before removal, so that particles of pus crust may not be disseminated in the air, and the dressings should be placed in moist receptacles and burned.— *International Journal of Surgery.*

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

TREATMENT OF HEPATIC DISORDERS — CIRRHOSIS.

BY DUJARDIN-BEAUMETZ,

Member of the Academy of Medicine, Physician to the Cochin Hospital, Paris.

Translated by J. H. Kellogg, M. D.

(Continued.)

IT is always at the beginning of the cirrhosis that a cure is obtainable, but in proportion as the contraction of the connective tissue is developed, thus destroying the hepatic cells, recovery is less likely to occur. Semmola, indeed, maintained that when the liver has become atrophied and deformed, a cure is no longer possible. It is then true, as Hanot and Gilbert have said, that it is in cases of cirrhosis in which the liver is large that we find the greatest chance of cure. Those are, in fact, the only ones which have been cured. The case which I have previously cited is a remarkable example of this. There have been hyperplasia of connective tissue, but the hepatic cell itself was not destroyed, and the liver weighed 2.700 kilograms (5.09 lbs.).

Can we, during life, recognize by positive symptoms, the state of the hepatic cell, and, aside from physical signs which enable us to determine the volume of the liver, have we other symptoms by which we may be guided in our prognosis? The most important evidence is to be drawn almost exclusively from an examination of the urine. In an excellent article upon alcoholic cirrhosis, Mérigot, of Treigny, observed that the more scanty the urine, and the less effect obtained from ordinary diuretics, the more grave is the prognosis. An examination for urobilin should also be made. Two other symptoms give indications respecting the state of the hepatic cell, namely, the quantity of urea secreted in twenty-four hours, and alimentary diabetes. But more importance should not be attached to these indications than they really possess. As regards urea, patients suffering from cirrhosis, especially in the advanced stages of the disease, suffer from such disturbances of nutrition that the small quantity of urine is easily accounted for without considering the condition of the hepatic cells. According to Semmola, when in a patient suffering from cirrhosis the quantity of urine is found to increase under an exclusive milk diet, the prognosis is favorable.

As regards diabetes, you will recall that it has been advised, in cases of cirrhosis, to administer syrup of glucose, and to examine for the presence of glucose in the urine. Sugar will be found, as a rule, when the hepatic cell is destroyed. But the problem is here more complex than it might be thought to be, and I have already called attention to the fact that when hepatic cirrhosis occurs in a diabetic, the diabetes disappears, and that even when starchy food is used. It is easily understood that this is the natural result of the destruction of the glycogenic functions of the liver. There is no contradiction between these two facts. If glucose is administered to a person whose hepatic cells have been destroyed, the glucose is not stored in the liver, and may appear in the urine. In a diabetic, on the contrary, who, in consequence of the exaggerated functions of the hepatic gland, makes a greater quantity of glucose than can be used physiologically, the appearance of the malady which destroys the glycogenic functions of the liver causes the diabetes to disappear, notwithstanding the use of starchy food.

In fact and in practice, the most important sign is the more or less rapid appearance of ascites. When a fluid reappears slowly after removal by tapping, or fails to reappear, this fact is evidence that in spite of the alterations in the liver, a sufficient portion of the gland remains intact to enable the portal circulation to be reëstablished, and the functions of the liver to be resumed. But the fact of the disappearance of ascites in cases of chronic alcoholism raises another question which must be considered, namely, Is ascites, in these cases, always due to cirrhosis?

Clinical facts have replied to this question. Lancereaux, in 1863, Thomeuf, in 1869, and Leudet and Hilton-Fagge later, affirm that in cases of chronic alcoholism there may exist a chronic peritonitis with ascites. It is easily comprehended how

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difficult must be the diagnosis between ascites originating in alcoholic peritonitis and that occasioned by alcoholic cirrhosis. It is even probable that the cases in which a cure has occurred after a great number of tappings, more than 100 in certain cases, must be considered as cases of ascites due to chronic peritonitis. Besides chronic peritonitis of alcoholic origin, it must be remembered that, tuberculosis being a frequent complication of alcoholism, we may encounter cases with affusion of tuberculous origin.

While, then, it may be said that a relative cure may be obtained in patients suffering from cirrhosis in the hypertrophic stage, it must be remembered that the proverb, "Who has drunk, will drink," never has a more apt application than in cases of alcoholic cirrhosis, and that the imperfect action of the liver in these cases renders these patients liable to many disturbances. The least cold or the least dietetic excess renews the congestion of the liver, and a return of the ascites.

As regards cirrhosis of the liver, I have nothing to say from an etiological point of view. It is a professional disease *par excellence*. In the experiments which I have undertaken in connection with Dr. Audigé in developing chronic alcoholism in hogs by the daily introduction of alcohol of different kinds by the stomach, in a series of experiments which continued during three years, we were never able to obtain hepatic cirrhosis, although we observed a great number of symptoms and lesions resulting from the alcohol. The failure to obtain hepatic cirrhosis in our experiments was due to the anatomical structure of the liver in hogs. The very resistant septæ which surround the hepatic globules protect the hepatic cells against the choking produced by sclerotic processes.

Nearly the same results have been reached by different authors who have experimented upon animals. Sabourin, Laffitte, Strauss, and Blocq have been able to produce disorders in the rabbit somewhat more pronounced, but still very far short of the cirrhosis of Laënnec.

We have now only to call attention to the means which may be employed to obtain a cure of cirrhosis when this is possible, and first, we will consider paracentesis. The physician is called, in a majority of cases of cirrhosis, only when the abdominal effusion has taken place, and has developed to such a degree as to interfere with the functions of digestion and respiration. The pre-ascitic stage, as Chauffard calls the period which precedes that of abdominal effusion, usually passes unobserved. Accustomed to frequent attacks of hepatic congestion, the inebriate gives the matter little attention, and takes no greater notice of the passing disorders relating to the urine, nor even the increase in size of the abdomen. The last symptom is most generally regarded as due to an accumulation of flesh. The fact that in the first stage of the disease pain is not the conspicuous symptom of cirrhosis, is often the cause of failure on the part of patients to observe the first symptoms of the malady.

On being called to a case of cirrhosis, the first question, then, is, whether or not tapping should be at once performed, or whether it would be better to wait for a time. In the discussion of this question, we will first establish a primary fact, which is, that when the fluid has reached a quantity exceeding six or seven liters (13 to 15 lbs.), it is very difficult by other therapeutic means than tapping, to cause the fluid to disappear. The effusion hinders the digestive functions, and especially the urinary functions. It is then necessary to leave the patient where he is, or to interfere by withdrawing the fluid. Is such interference dangerous?—In the majority of cases, no. In speaking thus I refer, of course, to the operation, in which complications seldom arise. It is one of the most simple operations in minor surgery. During my service as a hospital physician, I have never seen the operation followed immediately by any accident. But there are secondary accidents which have been well presented in a thesis of one of my students, Dr. Ch. Ehrhardt. We see, in fact, in the course of cases of cirrhosis, that profuse hemorrhage from the stomach or intestines may occur either before puncture for ascites or afterward. These hemorrages result from varices of the portal veins, which are produced by obstruction to the circulation in the parenchyma of the liver.

Is there always in these cases ulceration?—No; and the investigation made by one of my students, Dr. Courtois-Suffit, with his master Debove, has shown us that these ulcerations are usually not present.

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There also occurs in these cases, as in hemorrhoids, a veritable diapedesis of blood through the distended venous walls. Among the causes which favor these venous hemorrhages, should be placed all causes of irritation and congestion. Among the causes which produce irritation, must be especially mentioned alcohol, which irritates and inflames the gastro-intestinal mucous membrane. Exposure to cold, by congesting the abdomen, increases the venous engorgement. Causes which produce prolapse and displacement of the abdominal viscera, also produce hepatic congestion. When the amount of the ascitic fluid is very great, there is a mechanical compression of the portal veins. The effect is similar to that produced by elastic stockings upon varicose veins of the legs, and is, to a certain degree, a preventive of hemorrhage from the portal veins. If the fluidis suddenly withdrawn from the abdominal cavity, this condition of the circulation is rapidly changed, producing considerable venous distension, which may resultin hemorrhage.

This is not merely theoretical, as is illustrated by a case which recently occurred in my own service. A patient suffering from cirrhosis, very cachectic, was tapped two days after he entered my service. He died, and the autopsy showed the cause of his rapid death to be gastro-intestinal and peritoneal hemorrhage. Hence the rule, never to remove at one time too great a quantity of fluid in cases of cirrhosis, and to remove the fluid slowly.

However, my student Caussade has reported a case of hepatic cirrhosis in which in three years he had made thirteen tappings, withdrawing more than 300 liters (660 lbs.), and Troisier reported a case in which a cure took place after eighteen tappings. It is important to discard large trocars, and proceed slowly with an aspirator in evacuating the ascitic fluid.

I believe also that it is preferable to make several tappings and not to withdraw all the liquid contained in the abdomen at a single seance. This is a condition to which neither the physician nor the patient will readily assent. The patient always insists that as much liquid as possible shall be withdrawn, and as all usually goes well, the physician readily accedes to the demands of the patient. I think that it is much more rational to withdraw not more than 5 liters (11 lbs.), and to repeat the tapping at frequent intervals, rather than to remove all the fluid at once. But all this depends upon many circumstances: the general state of the patient, the quantity of liquid, and the amount of interference with respiration. The condition that ascitic fluids should be withdrawn slowly or in small quantities, has led some physicians to think that we might utilize in these cases the proceeding which consists in maintaining a permanent opening into the abdominal cavity. This proceeding, however, gives in practice very mediocre results. Either the opening closes itself rapidly, or, if it persists, more or less serious inflammations arise from the incision as the result of the contact of the liquid with the skin. There may appear symptoms analogous to those which follow puncture for the relief of edema of the legs. In the last stages of cardiac affections, I believe that it is wiser to employ the simple proceeding of the partial withdrawal of the ascitic fluid.

So much for the first tapping. It now remains to give instruction respecting subsequent tappings. If the abdomen is completely emptied by the first tappings, the question of a new interference must be determined by the rapidity with which the fluid returns. In cirrhosis, the removal of the ascitic fluid is never more than palliative, and when the fluid returns rapidly, it is easy to understand that rapid wasting must occur as the result of the enormous amount of fluid, 20–25 liters (40–50 lbs.) which is furnished by the system. Consequently it is necessary to delay the intervention in these cases as long as possible, and to resort to it only when required by interference with respiration.

When, on the contrary, the reproduction of fluid is slow, so that four, five, or six weeks may intervene between the tappings, this measure may be employed with greater freedom. There are some patients, in fact, who have endured such tappings for years.

In cirrhosis, death results not simply from the circulatory disturbance produced by the affusion, from digestive disorders, or from hemorrhages, but from another cause which has not been sufficiently noticed. I wish to speak of the suppression of the hepatic functions.

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This suppression gives rise to a group of symptoms which have been compared to uræmia, and the patient sometimes succumbs to a coma very analogous to that which is observed in patients afflicted with suppression of the renal functions.

After paracentesis, comes, in the order of importance from a therapeutic point of view, the use of milk. Here is a most happy application of the exclusive milk regimen, and indeed, in this respect, all authors are unanimous, from Chrestien, who in 1831 recommended the utility of milk in the treatment of abdominal dropsy. Until our own time, all cases of cirrhosis have been submitted to this regimen. But Semmola has appeared the warmest partizan of this method. Milk acts in two ways: 1st, as a diuretic, by virtue of the lactose or water which it contains; 2nd, by the small amount of toxines which it furnishes to the body. Let us not forget that the cirrhotic liver possesses no antiseptic properties, and that if left to itself, it allows the toxines manufactured within the intestinal canal or introduced into it, to pass through into the blood unchanged. Finally, it acts favorably upon the gastro-intestinal irritation, which is the most common condition in habitual inebriates.

There is not a single diuretic which has not been recommended for these cases. It should be remembered that diuretics often fail, and that when cirrhosis has reached the atrophic stage, it is impossible to increase the activity of the kidney sufficiently to combat the ascitic effusion. The cirrhotic patient, in fact, as has been said, urinates into his abdominal cavity, or at least the blood serum passes in such abundance into the peritoneal cavity that the urinary function is, so to speak, completely arrested. I will indicate only a few of the pure diuretics: I have employed the hippurate of lime recommended by Poulet, to combat hepatic congestion, and with the following formula:—

℞	Acid hippuric,	25 grams,
	Milk of lime,	q. s. to neutralize,
	Syrup of sugar,	500 grams,
	Alcoholate of citron,	q. s.

I give four to six soup spoonfuls of this syrup daily.

Calomel has been recommended, a triple action being attributed to this medicament: to act upon the liver, to purge the patient, and to act as a diuretic. We know that since the work of Jendrassik in 1886 and since the researches of Germain Sée, calomel has been considered as able to render great service in the treatment of cardiac dropsies. Jendrassik recommended calomel in doses of 12 grains daily. Germain Sée advised 7 to 9 grains; Bouchard, 3 grains. It should be well understood that this medication can be continued at the farthest only two or three days. I never employ calomel in cirrhosis, for a reason which I have already given, namely, I fear the appearance of mercurial salivation, which might still further increase the cachectic state of the patient without giving any of the curative results of the drug. There is another diuretic which has been greatly praised in England, and more recently in Russia. I refer to copaiba. It is not the balsam which is employed, but the resin, which is much better tolerated by the stomach than the balsam. The dose of this resin is 4 grams (1 dram) daily.

I know that the balsam of copaiba is not a balsam in the pharmaceutical sense of the word, but a turpentine composed of an essence, a volatile principle which is eliminated through the lungs and gives a peculiar odor to the breath, and a resin which is eliminated by the urine. This is the acid copaivic. It is this acid of which we make use.

With these diuretics, purgatives have been associated; but here it is also necessary to make some reservations. The venous stasis in the portal veins produces an edema of the intestinal mucous membrane, from which result hemorrhages, hemorrhoids, and abdominal flux. If we employ drastic cathartics, the patient may be weakened without being benefited.

It is necessary to be very prudent as regards hydrotherapy and electrization. It is necessary to be very prudent, as Millard has remarked, in the employment of cold water in cirrhotic patients. The least congestion produced in the liver occasions the reappearance of the symptoms. As to electricity, it may cause the effusion to disappear and restore the urinary secretion. In spite of the observations cited in support of this view, the experiments which I have made have given me no result.

In conclusion, I will mention a medicament which has been very highly rec-

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ommended, particularly by Lancereaux; I refer to iodide of potash. For a long time, iodine and iodide of potash have been very highly recommended for ascites recurring in syphilitic patients. It is well known that syphilis, and particularly hereditary syphilis gives rise to congestions of the liver and spleen which may be accompanied by ascites. In such cases we can easily understand the utility of the iodides. But Lancereaux has maintained that iodide of potash is capable of antagonizing the hepatic sclerous process. Large doses are required, from 2 to 4 grams (1 to 1½ drams) daily. It is a good plan, in giving large doses of iodides, to employ in addition a milk regimen to favor diuresis and the elimination of iodine by the urine. Relying upon the same principle, Semmola required that the iodides should always be dissolved in a great quantity of water. He employed a liter of water as the vehicle for the daily dose.

(To be continued.)

EXPERIMENTS ON BREAD AND BISCUIT.

BY M. BALLAND.

Translated from the *Revue Internationale des Falsifications*.

1. ACCORDING to our experiments, the interior temperature of bread coming from the oven is always between 97° and 100° C. (207°–212° F.) It never exceeds 100° C. (212° F.), even when the baking is continued for 40 minutes, the time of baking usually being 30 minutes. This temperature lowers progressively, and it is only after five to six hours that a loaf weighing about two pounds acquires the temperature of the surrounding atmosphere.

2. The interior of the loaf contains, ordinarily, from 35 per cent to 49 per cent, and the crust from 16 per cent to 25 per cent, from which it results that 100 parts of crust represent in nutritive value exactly 135 parts of the soft portion of the loaf.

3. There is no relation between the quantity of water in the soft portion of the loaf and the crust. Of loaves of the same weight and the same form, the proportion of water contained in the soft portion of the loaf and in the crust is independent of the weight of the loaf and of its form. The difference in the two cases may be as great as 9 per cent or 10 per cent. For the soft portion of the loaf, the difference comes from the variable quantity of water taken up by the flour during the working of the dough. Some minutes more or less in an oven more or less heated, are a matter of small consequence as regards the soft portion of the loaf, but in reference to the crust it is different.

4. It is not indifferent what portion of the loaf is taken in determining the proportion of water. In round loaves it is proper, as Millon advised, to employ a circuit of bread weighing 150 grams running with an acute angle from the center to the circumference; but it is preferable, for loaves of all sorts, to divide the loaf into two or four parts, as symmetrically as possible, and to dry a half or a quarter. It is without doubt a different process that has led many authors to find in certain parts as much as 48 to 50 per cent of water. That is the maximum amount found in the soft portion of the loaf.

5. The amount of water which a loaf contains is in direct relation to the form of the loaf. A round loaf of 1500 grams (375 drams) contained 39 per cent water, while a round loaf of 750 grams made from the same dough contained only 35 per cent, and a long loaf of the same weight contained about 33 to 34 per cent.

For equal weights there is, then, an advantage in having loaves rich in crust.

6. The water contained in army biscuit, according to numerous observations, was found to vary with the season between 11 per cent and 14 per cent.

7. Bread coming from the oven, placed in a dry place and sufficiently aerated, dries slowly, until it contains about 12 per cent to 14 per cent of water; that is to say, only the amount of water normally contained in wheat and flour.

The time of desiccation, which is thirty or forty days for loaves of 750 grams, is no more than eight to ten days for small, long loaves of 70 to 100 grams. The latter, after spontaneous desiccation in free air, contained no more water than the ordinary military biscuit, and can be preserved equally well. They are moistened in water, tea, coffee, milk, and soup, better than the ordinary soup-bread of the soldier, and preserve this property during many years. They take up instantly, so to speak, five or six times their weight in water, when biscuit take scarcely their own weight.

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Dunham's Test for Cholera. — In an article in a recent number of *La Semaine Medicale*, Prof. Koch approves of Dunham's test for cholera, known as the "Red Cholera Reaction," which, according to Prof. Koch, is conclusive, provided the following rules are regarded: —

"In the first instance care should be taken to select a good preparation of peptone, for all peptones are not equally well adapted for this test. The variations observed are probably due, as was pointed out by Bleisch, to a difference in the quantity of nitrates present. The delicacy of the reaction can therefore be increased by raising or lowering the proportion of nitrates in the peptone solution, as was suggested by Bleisch. It is also essential that the sulphuric acid used should be free from all trace of nitric acid. Moreover, success depends on a third condition, viz., the cultures of cholera bacilli employed should be absolutely pure, for with mixed cultures the results remain open to the objection that the indol and nitrous acid which gave the characteristic red coloration were the products of the secretion of other organisms than those of cholera.

"Cholera cultures in broth never give, even in the presence of peptone, a very distinct and uniform reaction. Hence, the test should only be performed with pure cultures of the bacilli in sterilized peptone solution."

Intestinal Digestion. — Mc Fadgen, Mencki, and Sieber have recently reported the results of their observations upon an interesting case in the clinic of Prof. Kocher, of Berne. The patient, 62 years of age, had been obliged to undergo an operation for strangulated hernia, which required the removal of several inches of the small intestine at its point of junction with the cæcum, and also a portion of the cæcum. The intestine was attached to the skin, forming an artificial anus and excluding the large intestine. The following conclusions were reached by the observations: —

1. The time required for food to reach the large intestine after being taken into the stomach, is from two to five hours.

2. From 14 to 23 hours are required for foods not the most easily digested, such as green peas, to pass the entire length of the small intestine.

3. Fermentation of the carbo-hydrates takes place in the small intestine, but proteid foods do not undergo putrefaction until the large intestine is reached.

4. About 86 per cent of the albuminoids are digested and absorbed before reaching the ileo-cæcal valve.

5. The patient gained in weight, showing that the function of the large intestine is not absolutely essential to life.

Influence of Cold Baths upon the Urine. — According to Winternitz, the quantity of toxines contained in the urine, in typhoid fever, is increased six or eight times by means of a cold bath, indicating that by the application of cold, in some way, there is an increased elimination of these poisonous matters from the body. This may possibly be connected with the fact that, as has been shown by Winternitz, the application of cold to the part results in an accumulation of leucocytes.

Rectal Alimentation. — Huber has recently shown by actual experimentation, that from 58 per cent to 70 per cent of fluid egg albumen may be absorbed from the rectum without peptonization. A slightly larger proportion of albumen was absorbed after peptonization, but less than half as much when chloride of sodium was not added. The proportion of salt found necessary to stimulate absorption, was one gram, or one fourth of a dram for each egg.

Immunity against Diphtheria. — Bardach has recently shown (Wratch, No. 6) that the serum of dogs, rendered immune by repeated inoculations, may be used for rendering immune the rabbit, the guinea pig, and the mole. It may also be used curatively, the infected animals being inoculated by subcutaneous injections of dog serum, it is found to be perfectly innocuous.

Lotion for Diphtheria. — Recommended by Dr. Ozegowski, an eminent Russian physician.

℞. Carbolic acid crystals, citric acid crystals, tincture of iodine, each 5 parts,
Brandy, 100 parts.
Apply with a cotton swab every two or three hours.

For Cystitis. — Wash out the bladder daily with ½ per cent solution of lysol.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Influence of Light on Bacteria.—Some experiments have been made in the laboratory of Prof. Batalin, by Mr. Koltjar as to the influence of light on bacillus pseudo-anthracis, the sarcina aurantiacca, the micrococcus prodigiosus, and a raspberry-red coccus. These microbes were cultivated on agar and potato. Light was passed through stained gelatine covering the test-tubes. Light prevented the growth of these bacteria, but the author says the effect was not as great as other observers have related concerning the action of light on pathogenic microbes. Concerning the colored rays, white sunlight prevents the growth to a considerable extent, the violet only slightly prevents it, and the red favors it. The production of pigment in the chromogenous bacteria corresponds with the luxuriance of their development. The sporulation of the bacillus pseudo-anthracis was favored by the violet rays.

P. P.

A New Order of Schizomycetes.—In the *Bot. Gazette* xvii (1892), pp. 389–406 (4 pls.); and xviii (1893), pp. 29 and 30, Mr. R. Thaxter proposes the name of myxobacteriacæ for the new group of schizomycetes resembling somewhat the myxomycetes. They have been discovered in gelatinous growths on decaying wood, vegetable substances, fungi, etc. They are motile, rod-like organs, says the journal of the Royal Microscopical Society (June, 1893, p. 370), multiplying by fission, secreting a gelatinous base and forming pseudo-plasmode-like aggregations before passing into a more or less highly developed cyst-producing resting state, in which the rods may become incysted in groups without modification, or may be converted into spore masses.

"The order comprises Berkeley and Cooke's genus Chondromyces, placed by Berkeley among the Stilbiacei, and includes also Berkeley and Cooke's genus Stigmatella, and probably also Schröter's Cystobacter. In addition to Berkeley and Cooke's two species, C. crocatus and aurantiacus, two new species are described, C. lichenicolus and serpens. The diagnosis of the genus is thus given: Rods forming free cysts, in which they remain unmodified; cysts various, sessile, or borne on a more or less highly developed cystophore. In addition the author describes two new genera; viz., Myxobacter, rods forming large rounded cysts, one or more free within a gelatinous matrix raised above the substratum; with two species, M. aureus and simplex. Myxococcus; rods slender, curved, swarming together after a vegetative period to form definite more or less encysted sessile masses of coccus-like spores; with three species, M. rubescens, virescens, and coralloides. The formation of plasmodes or pseudo-plasmodes appears to present an affinity to the Mycetozoa."

P. P.

Bactericidal Influence of the Blood.—Experiments in this line by Mr. Kionka, published in the *Centralblatt für Bakteriol. u. Parasitenk.*, xii., and quoted by the journal of the Royal Microscopical Society, covers the ground of those of Christmas in Paris, and are intended to demonstrate that the results obtained by the latter experimentalists may be interpreted in a different manner than he has done. The first experiments made with anthrax and bacilli of typhoid fever demonstrated that sudden changes from one medium to another did not abolish the bactericidal influence. In the second set, anthrax and typhoid bacilli and staphyloccocus pyogenus aureus were cultivated in body juices (pleuritic exudate and hydrocele fluid), exposed to the influence of CO_2 after the cultivation media had been heated to 55° C., after which the body juices lose their bactericidal influence. The author failed to discover that CO_2 had any power to inhibit the growth of micro-organisms. The third series was made with typhoid bacilli (a), fresh from the human body, and (b) cultivations from artificial media. These two kinds of cultivations were made in various media of human blood serum, in peritoneal and plural exudations, but little difference in the growths was noticed.

"Is the bactericidal property of blood serum a vital phenomenon, or merely a chemical process? Such is the question propounded by Prof. R. Emmerich, Prof.

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J. Tsuboi, Dr. Steinmetz, and Dr. O. Löw, and their experiments were directed toward the nature of the microbicidal proteids of serum. To solve the problem, it was necessary to obtain the serum proteids in a pure condition, and then to restore the activity and germicidal property to those proteid substances which had been rendered inert by chemical processes, such as precipitation, drying, etc.

"From *a priori* considerations this would appear an impossible task; but the authors are satisfied with the results of their experiments, showing that this difficulty has been overcome. In the first set of experiments the serum was precipitated and then dissolved in water. In the second set the serum-albumen was precipitated with alcohol, and dissolved in 4 to 5 per cent potash solution. In the third set the serum-albumen-potash solution was heated to 60°–63° C. They conclude from the results of these experiments that the microbicidal property of blood serum is not a vital phenomenon, but is merely a chemical process.

"In the course of their remarks the authors point out that on two occasions in the series where they were dealing with the alkalinized serum heated up to 60°, the number of bacilli was obviously diminished. This is the strongest proof they bring against the position of Buchner, who attributed the bactericidal power of serum to some inherent (vital) property; since if heated to 55° this power was lost. That it is due to alkalinity they think is shown by the action being increased by alkalinity and being decreased by acidity, a position very similar to that taken up by Von Fodor some years ago. Von Fodor showed that by augmenting the alkalinity of the blood the bactericidal power was increased." P. P.

Destruction of Microbes by Infusoria.—D. Harvey Atfield (*British Medical Journal*), a student in the Hygienic Institute of the University of Munich, recently carried out a number of experiments at the suggestion of Dr. Emmerich, for the purpose of determining whether microbes of polluted river water are destroyed by infusoria. The experiment shows very clearly that the low forms of animal life which abound in river water are exceedingly active in the destruction of bacteria, and hence of service in the purification of water. In one instance, water which contained 3,000,000 bacteria per cubic centimeter (¼ dram) was found to contain at the end of ten days after infusoria was introduced, only 13,000 bacteria, a proportionate decrease of 200 to one. In another case the decrease was 500 to one. In another case of water placed under the same conditions, without the infusoria, the number of bacteria increased from 700 per cubic centimeter to 121,500.

Tetanus Cured by Tetanus Antitoxine.—Another case of tetanus successfully treated by Tizzoni's antitoxine has been reported by Magagni. The patient, a man aged 27, was discharged as cured 28 days after the first appearance of the symptoms.

Purification of Vaccine Lymph.—S. Monckton Copeman (*British Medical Journal*) has shown experimentally that by an admixture of a watery solution of glycerine, extraneous germs may be eliminated. It is only necessary that the mixture should be preserved for two or three months before using it. A culture inoculated by such a mixture proves to be entirely sterile, the preservation of the glycerine having the effect to destroy foreign microbes without affecting the vaccine matter at all.

A New Smallpox Bacillus.—Besser (*Centralb. f. Bakt.*) recently observed, in an examination of the papule in a case of smallpox at the fifth day, a bacillus measuring ¾ to 1½ M. in length, with a breadth one fourth as great. The rod-shaped bacillus was slightly pointed and thickened in the center. The bacilli were comparatively long lived, and capable of enduring considerable variations in temperature. The bacillus is aërobic, stains with ordinary aniline dyes, grows well upon agar and broth, but refuses to grow upon potatoes, serum, or gelatine. This bacillus is different from any which has previously been observed in smallpox, and is regarded by the discoverer as the specific organism of smallpox, though as yet no inoculatory experiments have been made.

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OXYGEN AND ALCOHOL FOR SEPTICÆMIA.

AT the last meeting of the American Gynecological Society, Dr. Currier, of New York, read a paper in which he advanced the idea that septicæmia is an acute toxic mycosis of the blood, resulting from the decomposition of substances in the intestines and the absorption of the toxic products, the absorption of decomposed material from the genital canal after labor, or the absorption of toxic substances through the serous surfaces after an operation on the abdominal or pelvic organs. If recovery occurs, it is obtained by means of phagocytosis which disposes of the germs, and by the oxidation and elimination of the toxic products. The author recommends giving highly concentrated liquid food and alcohol and the administering of oxygen.

No fault can be found with the doctor's theory concerning the nature of the disease, nor the importance of sustaining the patient by easily assimilated food, and his suggestion respecting the use of oxygen is especially valuable. We have used this remedy in cases of septicæmia with wonderful effects. The cyanotic appearances observed in case of intense systemic poisoning, we have seen disappear as if by magic as the result of the inhalation of oxygen by means of a mask placed over the face, the oxygen being received from a large distended rubber bag. It is impossible to understand, however, by what theory, consistent with the results of modern physiological investigation, Doctor Currier administers alcohol along with oxygen. It is well known that alcohol diminishes the power of the red corpuscles to transmit oxygen to the tissues, since it has a powerful affinity for hæmoglobin, combining with it as soon as it enters the blood and destroying its ability to absorb oxygen. We most heartily recommend oxygen in septicæmia and other allied conditions, having demonstrated its value by personal experience; but we must with equal emphasis condemn the use of alcohol in such cases. This drug is itself a toxic agent, and not a food, as is supposed. Attention was called to this fact by Dr. Hart, the eminent editor of the *British Medical Journal*, in his recent address on cholera at Milwaukee. His suggestion was that alcohol should never be used in cholera, since it is a toxic product, and closely allied to the ptomaines with which the system is struggling, and hence could be only a detriment. The use of alcohol in cases of toxæmia can be condemned only in the light of our modern knowledge respecting the relation of toxic substances to the human body. Oxygen is nature's sovereign remedy for these cases. It is only through its agency that recovery is possible. But nothing could be more inconsistent, and we can scarcely think of anything more detrimental to the patient, than the use of alcohol, since this drug not only introduces additional poison requiring oxidation into a system already loaded with such poisons, but lessens the power of the body to absorb and distribute the only agent by which the oxidation and destruction of the poison can be effected.

In a discussion during the late meeting of the American Med. Asso. at Milwaukee, it was observed that many physicians who have had a scientific training are convinced that alcohol is of no service in many maladies in which it has been supposed to be indispensable. J. H. K.

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COUNTRY HOSPITALS.

MODERN discoveries relating to germs and their influence upon disease processes have revolutionized the science of medicine within the last quarter of a century. Especially in surgery have the most remarkable changes in methods and results been observed. Surgical procedures, formerly regarded as major operations, are now catalogued in the minor classes, while the mortality of such important operations as ovariotomy for the removal of tumors or diseased appendages has been brought down to less than one per cent in the practice of the most successful laparotomists. One surgeon has lately secured a series of 150 successive recoveries after this operation, in cases of the sort last referred to, a result hitherto unapproached, but likely to be often approached, and perhaps exceeded, in the future.

The great improvement in surgical statistics within the last few years has been attained largely through our knowledge of bacteriology. Spencer Wells and Lister succeeded by means of the extraordinary cleanliness which they secured through the use of the spray. Mr. Tait succeeded without the spray, by intestinal asepsis and drainage. In one case, the fundamental element of success was in lessening the number of microbes to which the tissues were exposed; in the other case, in increasing the protective activities of the body.

Mr. Tait's contempt for microbes is the natural outgrowth of his extraordinary success, while apparently ignoring them in his technique. Nevertheless, Mr. Tait's careful attention to the bowels both before and after the operation, the withholding of food and drink for forty-eight hours following the operation, and his rapid method of operating with a very small incision, thus restricting to the last degree the exposure of the peritoneum to microbes through contact with the air, constitute more effective means of protection against these agents of disease than the most elaborate methods depending upon the spray or irrigation; so that, while Mr. Tait professedly ignores microbes altogether, he may be considered almost a model aseptic surgeon, in contrast with Spencer Wells, and others of the antiseptic school. The reason of his better success with aseptic methods than has been obtained with antiseptic methods is clearly understood in the light of the recent researches of Metchnikoff and other investigators, who have shown the importance of phagocytosis as a means of defending the body against microbes, and the recent observations which have so clearly shown the paralyzing influence of corrosive sublimate and other antiseptics upon the living tissues, even when used in very dilute form.

In the perfection of aseptic and antiseptic methods, great attention has been given to the asepsis and antisepsis of surgical instruments, the operator's hands, the field of operations, dressings, sponges, and everything connected with the patient, with the exception of the air surrounding the patient and the operator. It is really surprising how small an amount of attention has been given to asepsis of the atmosphere in which the operation is to be performed. It cannot be said that this subject has been altogether neglected, for Dr. Prince, of Illinois, several years ago called the attention of the profession to a plan by which he proposed to filter all the air entering the operating-room, the air being forced in by means of a fan. For a number of years, the author has used, in all serious cases, an electrical fan which forces the air through a filtering apparatus furnished with a funnel which directs the air upon the field of operation. Culture experiments made with this apparatus show that the air issuing from it is free from microbes.

As a rule, however, the importance of

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pure air in connection with surgical operations, seems to be very much underrated. One evidence of this is to be seen in the location of hospitals in the densest portions of our great cities. Mr. John Aitken, a few years ago, made a careful study of the relation of locality and surroundings to atmospheric purity, and by means of a special apparatus was able to determine with accuracy the number of microbes and dust particles found in a given volume of air. We quote the following from his report: —

"At Cannes, the number varied from 1500 particles when the wind was blowing from the mountains, to 140,000 particles when the wind was blowing from the town; at Hyeres the sea air contained 1800 particles, and at Mentone, 5000. Observations on the Rigi were striking, the number of particles falling in places as low as 240, and varying from that up to 2300, and doubtless on this fact depended the peculiar brilliancy and transparency of the atmosphere in this locality.

"Observations made in Scotland and elsewhere indicated in what extraordinary degree the pollution in the air was due to human agency. In regions clear of human habitations the particles fell as low as 200, while in and around villages the particles amounted to thousands, and in towns, to hundreds of thousands. His lowest observation was 200 particles per cubic centimeter. It was still a problem whether that was the lowest limit attainable, and how much of that was of cosmic origin and how much was due to natural pollution. The presence of clouds at great elevations proved that dust existed in the upper atmosphere, but there must always be a considerable quantity of cosmic dust present, from the millions of meteors which fell daily. He had reason to believe that dust condensed moisture before the air was saturated, and this led to a loss of transparency, because the dust particles, by condensing the moisture in the air, increased in size. There was no doubt that haze was often largely due to dust. The condition of the air during fog had been tested, and in all cases a large quantity of dust was found.

"The explanation of fogs probably was that calms increased the quantity of dust in the air; the dust increased the radiating power of the air, which soon got chilled to the condensing point, when fog was formed. Fogs were more frequent in towns, on account of the greater amount of dust in the air."

From the above facts it is evident that a large city is the most unfavorable of all places for a hospital. The great quantities of microbes deposited upon the streets, with the fecal discharges of animals, to say nothing of the miscellaneous germs furnished by other sources, are sufficient to keep the atmosphere of a town in a state of constant pollution with most deadly germs. The significance of infection from these sources is greatly emphasized by the recent observations respecting the bacillus coli.

We feel safe in thinking that the time will arrive, and it is to be hoped that it is not far distant, when hospitals for critical cases, such as laparotomies and other abdominal operations, will be located in the country. One good evidence of the advantage of a country location for a hospital is found in the fact that the best record ever made in a city hospital, that of Mr. Tait, of Birmingham, was 115 successive recoveries, whereas the recently published statistics of a hospital located in the suburbs of a small country town show a record of more than 160 recoveries after operation for removal of ovarian tumors or diseased tubes, ovaries, or uterus, without a single death. The country is the place for critical surgical work, an atmosphere containing only two or three hundred microbes in a given quantity of air is certainly preferable to one which contains hundreds of thousands, which Mr. Aitken found to be the case in cities. J. H. K.

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The Universal Science.— If there is any one science which may be said to be universal, it is the science of medicine. Every science, even every art, contributes something to it. There is no possible kind of knowledge which a physician can possess which he cannot utilize in performing his mission for humanity. If the physician takes a broad view of his work, recognizing that he is not to be a mere purveyor of pills and powders, but rather a helper of nature, a sanitary counselor respecting habits of life, a wise adviser respecting social conditions, a careful student of mental and moral as well as of physical conditions which may affect his patient, it at once appears that the widest possible knowledge cannot be amiss for the medical man who desires to do his full duty to his fellow-men.

This idea is not a new one. An Eastern writer records concerning Jiwaka, that at the close of his tutelagein medicine, his preceptor sent him into the country with instructions to examine carefully the ground for a distance of 16 miles, and to make a collection of all the fruits and flowers which he found which were of no use in medicine. After a careful search, the pupil returned with the declaration that he had met no substance which was not of use in medicine, for there was no such thing to be found on earth. This thought is a good one for the contemplation of young men and women who are meditating upon the medical profession as a life work. No profession, no pursuit in life, demands such a broad educational foundation. It is true that one may get along after a fashion with a modicum of general knowledge, and even a meager amount of special knowledge in the practice of medicine, but it is possible for such a person to lead a comfortable life only because he is too ignorant to be conscious of his ignorance and the blunders arising therefrom. The market is flooded with cheap doctors already. What the medical profession wants, what the world wants, is young men and women of good sense, good health, good natural ability, and good education, to enter upon the study of medicine with the determination of acquiring the most thorough preparation possible to obtain in the best medical schools. Such men and women will become a credit to the profession, rather than a disgrace and a burden. J. H. K.

Therapeutic Value of Mechanical Vibration.— Charcot has recently called attention to the great value of mechanical vibration as a therapeutic means in certain forms of nervous disorders. This remedy seems not to be generally known to the profession, but is by no means new. Mortimer Granville, more than ten years ago, perfected a small device which he termed a nerve percuter, by means of which fine vibrations may be communicated to the brain, spine, and nerve trunks.

Twelve years ago the writer began experiments in the same direction, but on a somewhat more extended plan. Two forms of apparatus were constructed, one consisting of a chair made to vibrate at the rate of about 1500 a minute; the other, a vibrating bar to be grasped by the patient, having a vibratory movement of a little more than 3000 per minute. These machines have been in use for the last twelve years, and for the last ten years Mortimer Granville's nerve percuter has been employed more or less in connection with them.

While it cannot be said that these remedies are a specific for any malady, they certainly produce decided physiological effects, and are possessed of therapeutic activity. Charcot claims this means to be of special value in certain forms of muscular tremor due to central disease. The writer hopes to elucidate this subject further in an extended paper in some future number. J. H. K.

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MEDICAL COOKERY.

THE writer quite agrees with Prof. Keen, the eminent Philadelphia anatomist and surgeon, who asserts that every physician should have as perfect knowledge of the kitchen and the proper methods of food preparation as of drug-stores and the methods of compounding medicinal agents. Of the two, the knowledge of dietetics and cookery, would, in the writer's opinion, be found much more valuable than the knowledge of drugs. Both kinds of information are important, but a thorough knowledge of food stuffs and their relation to the needs of the body, must be of inestimably greater value to the physician, than the information gained by the most thorough study of pharmacy and materia medica. Physicians frequently prescribe iron for anæmic conditions without considering that blood cannot be made of iron, but must be made, if at all, from the food. Strychnia is almost universally administered as a remedy for weak nerves, the fact that nerves cannot be made of strychnia being ignored. Weak nerves can be improved by proper nourishment only. In proper nourishment lies the only remedy obtainable for nearly all chronic maladies. Hence the importance that the physician should be thoroughly posted on the subject of materia alimentaria. If a good cooking-school and experimental kitchen could be connected with every medical college and every student be required to take a thorough course of instruction both in practical and the theoretical cookery, and dietetics a revolution in the methods of treating disease would quickly follow.

J. H. K.

Percussion.— According to S. Weir Mitchell, the inventor of percussion was a certain Dr. Avenbrugger. This German physician lived in the last century, in the early part of which he wrote a little pamphlet of 22 pages, in which he explained the methods of applying percussion in the treatment of disease, and asserted its value. It was not, however, until the early part of the present century that it was recognized by medical authority as being useful; and nearly another half century elapsed before its merits were fully recognized. Even at the present day there are few physicians who understand the great benefit to be derived from systematic percussion thoroughly applied; although, as Dr. Mitchell very well says, the contents of Avenbrugger's booklet were of greater practical value to man than all the ponderous volumes written by De Haen, Van Swieten, and Sprengel, the famous German medical authors who wrote during the time of Avenbrugger, and of greater importance to the human race than the results of the vast and bloody military campaigns which were waged while this little treatise slept in obscurity.

Percussion may be employed by means of the hand directly applied, or by means of instruments known as muscle beaters. These were first invented by Klemm of Germany, but have since been improved and variously modified by a number of inventors.

The best time for employing percussion is on rising in the morning or after a bath. The whole body should be gone over from head to feet, giving special attention to the spine, chest, head, and soles of the feet. In percussion of the head, only the tips of the fingers should be used. In percussion of the spine, particularly the lower part of the spine, the hand should be half closed. Great care should always be taken to avoid administering hard, stiff, or jarring blows. This necessitates a free wrist movement, as in piano playing. That is, the hand should move from the wrist and not from the elbows. The muscles of the forearm are much more easily controlled, and their force more readily and perfectly modulated, than those of the

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upper arm. For the general surface of the body no instrument is superior to the uncovered palm.

A good hand and the ability to administer a light, elastic, springing blow is essential in the administration of this form of treatment. This is an art which unfortunately is seldom well mastered by the professional masseur or masseuse.

J. H. K.

The Hunger Cure. — It has been shown within the last half dozen years that not only fevers, but a considerable number of chronic maladies, are due to auto-intoxication, and that the source of the poisonous agencies in a great number of cases, is decomposition taking place in the alimentary canal. In view of this fact the value of abstinence from food as a means of removing an original cause of disease, and thus aborting or checking its progress, must be recognized.

The value of fasting as a means of cure was found out more than a century ago, and practiced by the followers of Preissnitz, in connection with hydrotherapy. It was especially advocated in this country by Dr. Joel Shew, of New York. The hunger cure is a sovereign remedy for rheumatism, and is of great value in the first stages of typhoid and other acute fevers, in which abstinence for a week o longer is a more successful means of combating the febrile action than anti-febrine or anti-pyrine, or any of the anti-phlogistic medicinal agents furnished by our modern polypharmacy. J. H. K.

Absorption from the Stomach.— J. VON MERING, an eminent German investigator, has recently shown by experiments upon a dog that in cases of dilatation of the stomach or obstruction of the pyloric orifice, absorption from the stomach does not take place normally; and that when thick gruel is given at night, the quantity of fluid found in the stomach in the morning is actually increased. This observation was made on a patient suffering from dilatation of the stomach. He also observed that during the absorption of any substance from the stomach there is always more or less passage of water into the stomach from the blood. This experiment seems to show that absorption does not take place from the stomach when water is taken into an empty stomach, but that water passes into the intestine, from which it is absorbed. In cases of dilatation of the stomach, the ability of the stomach for absorption is diminished; as also is the ability to discharge the contents into the intestines, which accounts for the slowness with which liquids are absorbed, and the great thirst of persons having dilatation of the stomach, notwithstanding the great quantity of fluid taken.

Massage of the Prostate Gland.— Thure Brandt, the famous Scandinavian massauer, and the originator of pelvic massage as a means of relieving the disorders of women, has made an application of the same principles of treatment to certain forms of genito-urinary diseases in men, particularly enlargement of the prostate gland. It is evident that by means of the application of massage to the gland, the absorption of pathological products may be stimulated, and by an improvement of the nutritive condition of the tissues, it is possible that the hypertrophy may be relieved. The application is simple; the patient is made to empty the bladder. Then the index finger lubricated with vaseline is introduced into the rectum of the patient. With the top of the finger, gentle pressures and frictions should be made upon the gland. Brandt directs that the pressure should be made from within, upward, that is, toward the pubic arch. Volianski directs that the movement should be in the direction of the bladder, or with the lymphatic current. The application should continue for from one to three minutes. A number of cases have been published illustrating the benefits to be derived from this application.

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REVIEWS.

Tuberculosis of the Bones and Joints.— By N. Senn, M. D., Professor of Surgery and Clinical Surgery in Rush Medical College. The F. A. Davis Co., publishers, Philadelphia.

This, the latest important surgical work by Prof. Senn, is in no respect inferior to his previous remarkable productions. Dr. Senn's great activity and industry have within a few years placed him in the foremost rank of American surgeons. In fact, there is probably no American surgeon whose name and methods are so well known and so frequently used abroad as Dr. Senn's. The importance of tuberculosis in the surgery of bones and joints has not been appreciated until very recently; and in bringing together the important facts which have been developed within a comparatively recent period, and which have not been previously embodied in a work of this kind, Dr. Senn has placed the medical profession of the United States, and in fact all English surgeons, under great obligations to him. The work is written in Dr. Senn's usual practical and lucid style, and will be most acceptable to the profession everywhere. It is beautifully illustrated by several fine colored plates which do credit to the publishers. J. H. K.

The Relation of Peripheral Irritation to Disease. — By Simon Baruch, M. D., New York.

Dr. Baruch has for a number of years been doing good work in the interest of rational medicine, by the publication of the good results which he has obtained with hydrotherapy and other hygienic means. In this little paper, Dr. Baruch shows the possibility of the cure, by means of hydrotherapy, of many cases which it is fashionable nowadays to subject to operations upon the eye for "muscular insufficiency," or to laparotomy for removal of the ovaries. Referring to the first class of cases, Dr. Baruch well remarks that "the mournful record of these mutilated eyes and disappointed patients is a sad chapter in the history of this subject." He also calls attention to Dr. Roosa's recent observation that 84 per cent of all healthy persons present more or less lack of muscular equilibrium. We are glad to be able to endorse, most heartily, the following remark by the author: "I cannot bring myself to the belief that the removal of ovaries or tubes not presenting palpable and well-defined pathological changes, is ever called for, and I deem such a procedure an outrageous violation of the highest aims of our calling, which demands the condemnation of every decent physician." J. H. K.

Les Functions du Cerveau.— Par Jules Soury, Paris, Bureaux du Progrès Medical.

The work presents in an admirable manner the doctrines of the school of Strasburg, and those of the Italian school relating to the functions of the brain. The work is one without which the library of a neurologist or a student of mental science cannot be complete. J. H. K.

Report on Abdominal and Pelvic Surgery, including Thirty-two Successful Cases of Laparotomy.— By William H. Wathen, M. D., Louisville, Ky. An excellent paper by an excellent surgeon. The author calls special attention to the experiments of Grawitz, Laruelle, and Pawlowsky, and others, which show conclusively that the danger from peritonitis is increased by the use of antiseptic solutions in the abdominal cavity when septic matter is present, and that the tendency to adhesions is also increased. The author records thirty-one successful laparotomies, certainly a splendid record. J. H. K.

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MODERN MEDICINE

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BACTERIOLOGICAL WORLD.

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ORIGINAL ARTICLES.

THE NON-SURGICAL TREATMENT OF OVARIAN DISEASE.

BY J. H. KELLOGG, M. D.,

Battle Creek, Mich.

WHEN a pupil of the late eminent Prof. E. R. Peaslee, M. D., of New York City, the writer was most forcibly impressed by the conscientious conservatism and the painstaking and laborious attention to minute details with which this pioneer in modern gynecology applied his therapeutic measures in the treatment of chronic ovarian disease. Dr. Peaslee did for American medical gynecology, indeed we may properly say, for modern medical gynecology, what Simms and Emmett did for gynecological surgery. But the brilliant successes of the surgical treatment of ovarian disease achieved in modern times through the skillful labors of Hegar and Tait and their followers, have so eclipsed the hard-won and often by no means brilliant victories which have been obtained by therapeutic and non-surgical means, that the possibility of curing disease of the appendages without resorting to the use of the knife seems to have been, in some quarters, almost totally forgotten.

There seems to the writer to be, indeed, very great danger that the rising members of the profession will receive the impression that ovariotomy is about the only remedy for a diseased ovary. Witnessing almost daily in the amphitheaters of the hospitals connected with medical schools, the removal of ovaries, presumably more or less diseased, and hearing the report of the brilliant results thus achieved, while having little if any opportunity to witness the results of the long-continued, patient, and thorough application of non-surgical means, they go out to practice after graduation, perhaps with the theoretical knowledge that there are non-surgical means of treating ovarian disease, but with little practical experience calculated to impress this important fact upon their minds. Instead, they have probably heard reiterated many times, while the surgical knife has been held in hand by the professor, ready to make the first incision in a laparotomy, words something like the following: "Gentlemen, this is a case of intractable ovarian disease. Removal of the appendages is proposed as the only means by which a complete and permanent recovery can be hoped for." And after the operation is completed, the professor passes around the diseased tubes and ovaries, calling attention to their pathological condition, and expatiating eloquently upon the absurdity of expecting a cure in such a case, from the application of hot water, Churchill's tincture, medicated pledgets, faradism, galvanism, or any other but surgical means. In all probability the surgeon is right, the operation necessary, and in most cases successful. Nevertheless the fact that the majority of cases of ovarian disease which come to the attention of medical students in such a way as to strongly impress them, are women of the poor class who cannot afford to submit themselves to a long course of treatment, both because of the expense attending such a plan, and because of their inability to absent themselves for so great a time from their domestic duties, gives to the students of our medical colleges little opportunity for observing what can be done by persevering application of non-surgical measures; besides, there is something of a temptation in the *eclât* which accompanies the surgical operation, and the promptness and brilliancy of the results when successful.

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The outcome of this state of things, is, that resort to ovariotomy is coming to be a more and more frequent occurrence in cases in which older gynecologists would not have dreamed of employing surgical measures of any sort, and indeed we are compelled to believe that ovariotomies are frequently performed, especially by young surgeons, which more experienced operators would condemn as uncalled for. Twenty years ago, the teaching of such men as Prof. Peaslee, Fordyce Barker, and their contemporaries, thoroughly impressed the medical student with the idea that invasion of the sacred precincts of the pelvis was an operation not to be considered for a moment, except under circumstances the most pressing, and for reasons the most imperative. But the brilliant records of Tait, Keith, Spencer Wells, Bantock, Thornton, Savage, and other European surgeons, as well as some American operators, have given rise to the impression, which seems to be growing, that ovariotomy is an operation of so little gravity that it may be undertaken with little consideration, and without greater reason than the presence of pain or some other discomfort in the pelvic region, or some obscure neurosis in some other part of the body.

Having been medically reared under the most conservative teaching, and fearing that he might be inclined to hold himself so erect as to lean a little backward in relation to this question, the writer, a number of years ago, thought to balance himself up by placing himself for a few months under the tutelage of one whom he supposed to be the most ardent and ultra representative of the school of gynecological surgeons, Dr. Lawson Tait, of Birmingham. After acting as pupil-assistant for this surgeon, and standing with him at the operating table almost daily for four months, I was convinced that while Mr. Tait has removed more uterine appendages than any other living man, and still performs the operation of ovariotomy more frequently than any other surgeon, he is by no means the reckless and indiscriminate operator that he is by many believed to be. As assistant to Mr. Tait in dispensary work, I had opportunity to see poor women attending, week after week and month after month, who, should they appear at any one of quite a number of our American clinics, would be quickly hurried off to the surgical ward for the performance of ovariotomy, if not for the more serious operation of hysterectomy. Yet, on inquiry, it appeared that these patients had been for years regular attendants at Mr. Tait's clinic, and he had not even suggested the propriety of operative procedure.

In one instance, Mr. Tait began an operation upon a young woman of twenty for the removal of ovaries which he believed to be the seat of what he has termed exanthematic inflammation. After the abdomen was opened and the ovaries drawn up, first one and then the other, for inspection, being convinced that the organs were not seriously diseased, they were promptly returned and the incision sewed up. Mr. Tait was evidently not a little chagrined at his error in diagnosis, but although no person was present but the writer and another assistant, the ovaries were left behind, strong as may have been the temptation to remove them, as a verification of the necessity for the operation. Mr. Tait stated to the writer that on one occasion, having read a paper before a certain local English medical society in relation to the operation for removal of diseased appendages, he had occasion to visit the same society subsequently, and was horrified to find a considerable number of the members of this society ready to greet him, each with nearly a soup-plate full of ovaries, a large proportion of which, upon examination, proved to be entirely healthy organs.

There are, unquestionably, conditions of the appendages which are positively and absolutely incurable, and to attempt to treat which by any but non-surgical means, would be simply a loss of time, and, in some instances, a reckless risk of life; but, in addition to these cases, there is a great number of conditions which are amenable to remedial measures, provided just the right means and conditions are available, together with a skillful application of all the resources of rational gynecology. The discrimination in these cases from the former class is then a question demanding the highest degree of diagnostic skill. Accuracy and expertness in diagnosis is not attainable by any amount of book study. It can only be obtained by long and patient education of the diagnostic finger in conjunction with conjoined manipulation

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and a judicial balance of all the subjective and objective symptoms presented by individual cases.

There is no class of cases in which the *tactus eruditus* is so absolutely indispensable as is this. The finger must be trained so as to detect the slightest variation in density, tension, form, etc. Sometimes it is even necessary to watch the case with frequent examinations while it passes through one or two menstrual cycles, and sometimes it is even necessary to employ tentative measures of treatment for the purpose of observing the effects of therapeutic attempts. No case which has not had the benefit of such a diagnostic inquiry is prepared for subjection to a surgical procedure. It is probably a lack of experience in diagnosis, and if not in ignorance, a want of confidence in the efficacy of non-surgical therapeutic means, which is responsible for the performance at the present time of a vast number of unnecessary ovariotomies.

In speaking upon this subject, the writer considers himself prepared to speak without bias, and after having had an opportunity to see both sides of this question, he has at least had an opportunity to "look inside," and to verify his diagnosis in a sufficient number of cases to appreciate the advantages of experience in dealing with this most important class of surgical cases. An unbroken series of successes in ovariotomy (172 cases) might have led him to become something of an enthusiast, and perhaps an extremist, in favor of surgical interference, had it not been for the fact that within the same period of time in which this record has been made, a little less than two and a half years, a very much larger number of cases of ovarian disease have been successfully treated without the employment of surgical means of any sort, or, at any rate, none except means of a very minor character. The following is a brief description of a few of these cases, together with the therapeutic means employed:—

Case 1.

Miss W., a young woman aged 24, came to the Sanitarium Sept. 13, 1892. She had spent several years in boarding-school, where she had been subjected to the usual deteriorating influences of an artificial and sedentary life, an unnatural and unwholesome mode of dressing, and an objectionable dietary. As the result of these deteriorating causes, acting upon a naturally feeble organization, this patient was in such a wretched state that I informed her parents that she would probably require at least one year of thorough-going and systematic treatment to place her health upon anything like a sound basis. Examination showed that in addition to a very marked anæmia and a great variety of neurasthenic symptoms, there was also a posterior curvature of the spine at the middle dorsal region, resulting in extreme flatness of the chest and abnormal prominence of the abdomen, marked hyperæsthesia of the abdominal sympathetic and pneumogastrics; stomach and bowels sunken; left ovary prolapsed, enlarged, and extremely tender; severe dysmenorrhœa and menorrhagia; menstrual flow lasting a full week; constant backache, had had two attacks of pelvic inflammation; could take no exercise at all without inducing severe pelvic pain; for the last year and a half, had been receiving treatment of the eyes from an eye specialist who was laboring under the belief that muscular asthenopia, or eye-strain, was the cause of all the symptoms. She got steadily worse, however, instead of better, although she had several operations upon the muscles of the eye.

This patient was placed under the following treatment: Tonic baths, general applications of faradic electricity two or three times a week, massage, manual Swedish movements, Swedish gymnastics, and exercise with apparatus for the purpose of strengthening the muscles shown to be especially weak by the strength-chart,—a graphic representation of the condition of the body as regards muscular strength, which I use altogether as a basis for prescription in cases requiring training,—and also special exercises and apparatus work for the correction of the spinal curvatures referred to. Hot vaginal douches and appropriate local medication were resorted to as a means of relieving the local inflammation and congestion. The prolapsed ovary was placed in position, and daily kept in position by means of properly adjusted wool pledgets, so that the patient might suffer no injury from the physical exercise which she was required to take. As the result of this

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treatment, the ovarian tenderness and enlargement rapidly disappeared. Within six weeks the young woman was able to ride a bicycle two or three miles daily. She had previously learned to ride the bicycle, and so, as soon as she was able to begin this form of exercise, she made rapid progress with it. At the end of two months she entered my office one day, stating that she had just returned from a fourteen-mile ride, and had tired out a vigorous young man who was so exhausted that he had gone to bed, while she felt as vigorous as ever. Such a prolonged ride was certainly a very injudicious thing, and yet I could not discover that the patient suffered in the slightest degree in consequence, although very likely she would have done so if she had been at home. I therefore took the precaution to keep her in bed a few hours the next day, and administered a few hot douches and local antiphlogistic treatment, acting in harmony with the rule which I always follow; namely, when I anticipate a possible pelvic inflammation, to give the patient precisely the same treatment and with the same thoroughness as though inflammation were already actually present. During her three months' stay with us, this young woman became so well that she declared she felt stronger and better than ever before in her life. The pelvic inflammation, ovarian congestion, and other local disorders entirely disappeared. The curvatures of the spine, which were wholly due to unbalanced muscular action, were cured. The total gain in strength was — pounds, the increase being from — to —, when the patient returned to her home with rosy cheeks and ruddy lips, giving no evidence, either objective or subjective, that she was enjoying anything other than perfect health.

Case 2.

Miss H., aged 20, entered the Sanitarium Hospital as a patient. She had been bedridden most of the time for three years. The principal cause of suffering was extreme pain in the left leg, which seemed to originate from the left ovary; extreme pain in the left ovarian region; uterus anteflexed and retroverted; the patient generally feeble and anæmic. A scar in the median line below the umbilicus was evidence of the fact that she had had, some months previous, an abdominal section performed, the purpose of the operator having been to remove what he supposed to be a diseased left ovary. A disagreement between the two physicians who were in charge of the case at the time of the operation, as to whether or not the ovary was sufficiently diseased to require removal, led to a conclusion of the operation as an exploratory incision. I took care to restore it to position, and replaced the uterus, supporting it by means of a suitably adjusted pessary, and rendered the replacement permanent by shortening the round ligaments. Essentially the same measures as described in the first case were employed, and with the result that the patient is now entirely relieved of pelvic pain, goes about without assistance, although previously for months she had been obliged to use a wheel-chair, and will in a few days be sent home well. The operation for shortening the ligaments was perhaps a benefit to the ovary by aiding in retaining it in position, but was not performed with direct reference to the ovary, but for the purpose of correcting the retroversion.

(To be continued.)

New Method of Checking Hemorrhage after Tonsillotomy.— Doctor Dawbarn, of the Polyclinic of New York, details in the *Medical Record* a method of checking troublesome hemorrhage after tonsillotomy, which ought to be generally known. It consists simply of surrounding the bleeding surface with a purse-string ligature of silk or catgut. The ligature is not completely buried, but nearly so. A curved needle is introduced and withdrawn four times successively in the circumference of the bleeding surface, thus surrounding it. The needle being introduced each time near the point of emergence, by tying the ligature the tissues are drawn over the bleeding stump, being puckered together like the mouth of a purse by the string. J. H. K.

Application for Hemorrhoids.— Apply the following ointment daily after moving the bowels and thoroughly cleansing the parts.

Chrisarobin	grains xij.
Iodoform	grains v.
Extract of belladonna	grains ix.
Vaseline	drams iv.

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EXERCISE, THE REMEDY FOR THE EVILS OF CONVENTIONAL DRESS.

BY J. H. KELLOGG, M. D.

(Concluded from May No.)

A VERY large proportion of adult civilized women are suffering from the evil consequences of waist constriction. This is true even of those who have never worn corsets. Every woman whose skirts are not suspended from the shoulders is guilty of tight lacing. Some may stoutly dispute this assertion, but a moment's consideration will convince any one of its truth. If the skirt band is not tight, what holds the garment in place? The band may be made ever so loose, and when lifted about the waist, may show several inches of spare room, but when relaxed, it necessarily falls, obeying the law of gravitation, and continues to drop until with the gradual enlargement of the trunk toward the hips, it reaches a point where it becomes tight, when its advance in the downward direction is checked. The amount of constriction of the body resulting from a skirt band depends upon the weight of the garment; the heavier the garment, the farther down it is dragged, and consequently, the greater the constriction.

Shoulder straps or skirt suspenders are a snare and a delusion. The shoulders are rendered so uncomfortable by the drag of heavy garments, causing the narrow strips to press painfully and injuriously into the tender flesh, that the skirts are let down until the shoulders are relieved, which point is reached only when the weight of the skirts is again carried by the hips, and the skirt bands are again cutting into the abdominal walls, and dragging down the floating organs within the trunk.

These facts are mentioned in this connection for the purpose of awakening from their sense of security those women who imagine that because they have never worn corsets, they have never been guilty of tight lacing, and hence do not require to work out a salvation from the evils of conventional dress by means of special gymnastics, patiently, perseveringly, and systematically executed. And there are those, who, in like manner, console themselves by thinking that by the adoption of skirt supporters, or somebody's "health corset," they have made all the reform necessary, and have atoned for the physical transgressions of former years. Every woman whose dress has been constructed on any other plan than that of the union of garments, that is, waist and skirt combined, is a weak-waisted woman, and needs to be put through a course of special gymnastics for the purpose of developing the muscles of the waist, abdomen, and back. Here is to be found a cure for numberless backaches, sideaches, nervous headaches, dragging pains, and so-called "female weaknesses" of many sorts. For the benefit of some of those who may read these lines, and whom we may never have another opportunity of reaching, the following suggestions respecting modes of strengthening the muscles of the trunk are offered: —

1. Stand in the doorway in such a position that the toes will just reach the middle line of the door-sill. Stretch the arms high above the head, and place the hands one on each side of the door jamb, not on the inside, but on the side facing the body. The exercise consists in raising one foot and placing it forward as in walking, at the same time throwing the body forward with energy. The forward motion being arrested suddenly by the arms, a strong strain is brought upon the muscles of the front of the body, particularly upon those of the chest. After the forward movement, the foot is returned to its place beside the other. This movement is repeated eight or ten times with each foot. As in all other movements, the action should be deliberate, and energy and considerable muscular strength should be employed.

2. The following is another excellent movement for developing the muscles of the trunk: Place the feet about two feet apart, toes outward. Clasp the hands over the head, the elbows being thrown back so as to be in line with the head and with each other. Bend the trunk first to one side and then to the other. Repeat the movement eight or ten times deliberately. Do not bend the neck or sway the hips. The movements should be confined to the waist.

3. Taking the same position as described for the above, make similar movements, first backward, then forward, repeating eight or ten times.

4. With the hands, grasp at arm's length the top of a bed-post or other convenient point of support, a little be-

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low the level of the shoulders. Step backward two foot-lengths, keeping the body rigid, with the head, trunk, and legs in line. Now let the body fall toward the point of support by bending the arms at the elbows and return again to position by straightening the arms. Repeat the movement several times, taking care to make the movements slowly, and keeping all the muscles of the body, with the exception of those of the arms, in a state of rigid contraction.

5. The body is placed in the kneeling posture, with a cushion under the knees, and the heels prevented from rising when the body bends forward, by being placed under the edge of a sofa or some other convenient object. This movement affects not only the trunk, but also the muscles of the calf and thigh.

6. Lie upon a bed or sofa, or upon a mat on the floor. Raise the legs in alternation, extending the feet, that is, pointing the toe in the direction of the leg as forcibly as possible. The leg should be raised as nearly to a right angle with the body as possible.

The exercise last described, is a good one to begin with, especially for patients who are very feeble.

Here is another movement, which is also adapted to patients who are too feeble to take the more vigorous exercises above described: —

7. Lying upon the back, the legs and arms extended, raise the head forward as far as possible; hold while counting ten aloud; slowly return to position. Repeat the movement four or five times. This exercise should be taken eight or ten times a day. By placing one hand over the abdomen, it will be noticed that while the head is in a raised position, the abdominal muscles are in a state of continuous and vigorous contraction.

A word must be said about stair-climbing, which, instead of being, as many women suppose, a source of danger and damage, is really one of the most healthful forms of exercise. The mischiefs arising from stair-climbing are due to the fact that those who climb stairs do not know how to use their muscles in such a manner as to elevate their bodies along an inclined plane with the least expenditure of energy and without involving unnatural and harmful strain.

The sovereign remedy for the evils resulting from stair-climbing, is the maintenance of a correct poise while ascending or descending stairs. In the case of persons whose muscles have not been developed by proper training, the movements in going up and down stairs must be very deliberate. These two suggestions, if carefully followed, will protect any person able to go up and down stairs at all, from suffering any injury whatever thereby.

It must not be supposed that all the mischief resulting from wearing an unhealthful dress for many years will be instantly remedied by the adoption of a healthful dress, although the comfort and freedom experienced in a dress which allows unrestricted action of the muscles of the trunk, and imposes no burden upon the important vital organs of the chest and abdomen, is usually so great as to be thoroughly appreciated.

Not infrequently, however, the displacement of the internal viscera is so general and so extensive as to require the persevering employment of specific means for the restoration of these much-abused organs to their normal position. The displaced stomach, liver, bowels, and kidneys must be restored to their normal position by skillful manipulation, and the abdominal muscles must be strengthened by massage, the application of electricity, and other means until they are able to hold the internal organs in place.

The same is true respecting a displaced uterus and ovaries. The writer has clearly demonstrated, by a long series of observations, that displacement of the pelvic organs is rarely an isolated condition, but that it is only one feature of a general downward displacement of all the organs of the abdomen, or the greater part of them. The patient who is suffering from retroversion or prolapse of the uterus, also has prolapsed ovaries, prolapsed bowels, prolapsed or dilated stomach, and in a large proportion of cases, a prolapsed kidney; and in some cases both kidneys are prolapsed. Some of these organs may be immediately restored to position. This is true, for example, of the uterus, and generally of the ovaries also. A skilled specialist can place these organs in proper position at once, when firm and extensive adhesions have not taken place, and by proper mechanical supports they can be held in place. Prolapsed bowels, and usually a prolapsed kidney, can also be

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restored to position, and can be supported in their proper positions by suitably adjusted abdominal bandages applied in such a way as to support the lower portion of the abdomen without constricting the central or upper part.

Measures of this sort are required in many cases in which the mischievous work of waist constriction has been in progress for many years; and the relief experienced by the restoration of long displaced and disabled organs to position, is often so great as to lead the sufferer to believe that she is entirely cured of the ailments from which she has been crutch which an injured man employs while the disabled limb is recovering its natural activity.

In some cases where displacements have existed for a very long time, surgical means must sometimes be employed. When means of this sort are indicated, the happiest results may be expected, as by a suitable operation skillfully performed, it is usually possible to place a retroverted uterus in its normal position under conditions which will secure a permanent restoration. This is best accomplished by shortening the round ligaments —an operation which can be accom-

Fig. 6.—Renal calculus (kidney stone) weighing four and one half ounces, removed with a prolapsed kidney, the result of improper dress, by J. H. Kellogg, M. D., Sept. 12, 1892. Recovery. (Natural size.)

long suffering. This is, however, a serious error. Pessaries and abdominal supports are artificial means of holding in position organs for which nature has furnished natural supports, and are very poor substitutes indeed. These normal supports, which are for the most part muscular in character, must be restored by the application of suitable measures, such as massage, electricity, gymnastics, etc. The artificial supports are to be employed only temporarily, until the curative measures have had time to restore the normal supports. Pessaries and abdominal supports become in themselves means of disease and deterioration when long employed, and hence are necessary evils which can be tolerated only as a

plished in a few minutes (in the author's experience often not more than seven to ten minutes), and which does not involve any hazardous procedure nor any considerable amount of suffering. The operation is so slight it may be even completed without the use of chloroform or ether, the new anæsthetic —cocaine— being quite sufficient. A slight incision through the skin, one half inch to three fourths of an inch in length on either side of the body, is certainly not a formidable wound.

In more than 250 cases which have been elsewhere recorded, the writer has not seen a single case in which the patient's life was imperiled, and the results have rarely been unsatisfactory.

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These cases require, however, something more than a surgical operation. It is essential that the abdominal muscles and the natural supports of the uterus be strengthened by proper means, elec-

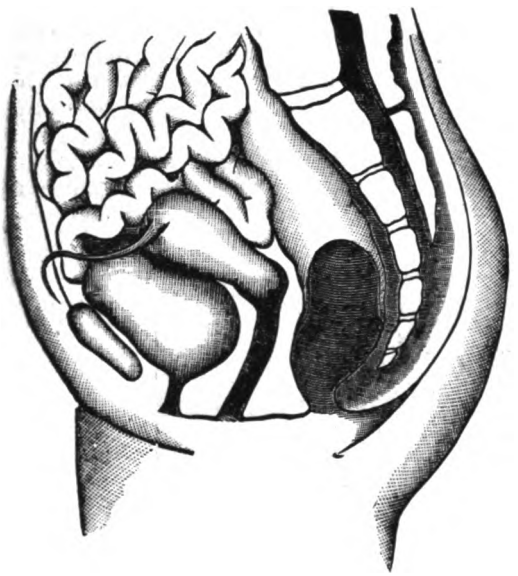

Fig. 7. Uterus in Normal Position, supported by the Round Ligaments, and lying upon the Bladder, with the Small Intestine behind, between the Uterus and the Colon.

tricity, massage, and medical gymnastics being the most important measures. The operation is not a mutilation. It simply restores the displaced parts to a normal position, and gives them a chance to return to health, which they cannot do so long as they remain out of place. Every woman who is obliged to wear a pessary for the relief of retroversion, ought to enjoy the benefits of this operation, which can be executed so quickly and so safely. The conditions which forbid its employment, other than the existence of certain diseased conditions, such as morbid growths, etc., are certainly very rare. The fact that some physicians have failed to make the operation a success, is due, not to the operation itself, but to the employment of a faulty method. The so-called Alexander operation has generally failed in this country, although Dr. Alexander himself made it entirely successful. The new method not only shortens the operation, but renders it almost certainly successful, and is employed by a sufficient number of reputable specialists in this as well as in other countries, to give the operation a creditable standing among gynecologists. In the opinion of the author, there are few operations required by the accidents and diseases to which women are subject, more successful than this, and none which yield such satisfactory results.

Surgical measures are also sometimes required for the relief of other conditions resulting from the wearing of clothes which constrict the waist, or drag upon the abdominal viscera. Concerning the value of these operations, it is impossible to speak so encouragingly as we have done respecting the restoration of a displaced uterus. These operations relate principally to displaced kidneys. Several means have been proposed by which a displaced kidney may be restored to its normal position. The operation, when skillfully performed, is not attended by very great danger, but is sufficiently serious in character to render its employment proper only in cases in which the suffering occasioned by the displacement is very great, and relief cannot be obtained in any other way. A displaced right kidney is not infrequently the cause of obstinate and most distressing pain, and sometimes the kidney becomes so diseased that restoration to position is not sufficient to cure.

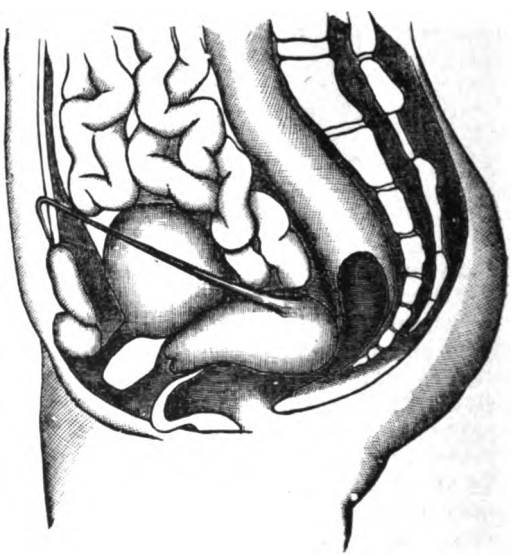

Fig. 8. Uterus Retroverted, the Round Ligaments Stretched and Elongated, with the Small Intestine between the Bladder and the Uterus, the latter Compressing the Colon.

In a case of this sort recently met by the writer, the kidney had become enlarged to several times its normal size, and continually discharged great quanti-

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ties of pus through the bladder. The organ first became displaced by waist constriction, and thus had become diseased, first from congestion, and then from inflammation and enlargement. It had been for many years a cause of great suffering to the patient, until her condition had finally become so critical as to require the adoption of radical means for relief. When removed, the kidney was found to contain a great quantity of pus, and in addition a solid calculus similar to those sometimes found in the bladder, which weighed more than four and one half ounces. (See Fig. 6.) The patient fortunately made a good recovery, is better off with one kidney than before the operation, and in fact enjoys very good health. Such an operation is of course attended with considerable risk to life, and is not to be thought of except in the most extreme cases. It is presented to illustrate one of the dangers which result from waist constriction. A displaced kidney may become a much more serious menace to life than a displaced uterus, and a cause of even greater suffering.

It must not be imagined that every woman who has long worn corsets, or who has been injured by the weight of heavy skirts dragging upon tight waistbands, requires a surgical operation. The cases in which surgery must be introduced as a remedy for these cases, are comparatively rare; but in all cases in which retroversion, prolapsed bowels, floating kidneys, or other visceral displacements are known to exist, or in which the existence of such a condition is suspected, a skilled specialist should be consulted, and proper measures taken to restore the displaced organ or organs to normal position. If necessary, artificial supports of some sort must be employed for a time, until the natural supports have been strengthened by exercise and proper treatment.

This is a principle which applies to other deformities, such as curvature of the spine, round shoulders, etc. The deformities must be corrected before exercises are taken for the purpose of strengthening the weakened muscles, which must be restored to their normal activity in order that the deformity may be corrected. If this precaution is not taken, the effect of the exercise may be to increase the displacement, or deformity, and to render it more intractable. Many ladies have been seriously injured by engaging in violent exercise in a gymnasium, with the idea that exercise would prove a sovereign remedy for their ailments, and in some cases what was considered moderate exercise has produced mischief. Exercises which would aid in keeping in place the uterus or ovaries when in their normal position, have the effect to force them still farther out of their position when they have fallen low in the pelvis, and are overridden by the intestines, as shown in Fig. 8. Fig. 7 shows the uterus in normal position, held well forward by the round ligaments, which connect the organ at its upper part with the abdominal walls. In Fig. 8 the uterus is seen turned over back, compressing the bowels, thus inducing constipation, and putting the round ligaments upon the stretch. It is in cases of this sort that the operation for shortening the round ligaments is often, though by no means always, necessary, as has been previously explained.

Sarcosporidia in the Cardiac Muscles of Man.—Dr. Bernhardt Rosenberg (in the *Zeitschrift für Hygiene*, February, 1892), reports a case of endocarditis following pleurisy in the left, in a woman of forty years. In making post-mortem examination, his attention was attracted by a considerable hyperplasia of the endocardium on one of the papillary muscles of the left ventricle. In the center of the muscle he was surprised to find, on section, a cyst about five millimeters long and two wide. At first he thought that he had to deal with a cysticercus. Microscopic examination revealed a striated envelope, like a sort of capillary canal. The contents consisted of various corpuscles; some were small masses of plasma filled with granulations amid which it was difficult and sometimes impossible to see a nucleus; other bodies appeared formed of a hyalin substance, sometimes with and sometimes without a nucleus. The author designates this parasite by the name of *sarcocystis hominis*. This nomenclature may not prove correct, for investigation was not sufficient to arrive at a correct conclusion. It is not established that the parasite was a true sarcosporidia.

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

PHYSIOLOGICAL ACTION OF CURRENTS OF GREAT FREQUENCY.

BY PROF. A. D'ARSONVAL.

Translated by J. H. Kellogg, M. D.

[PROF. A. D'ARSONVAL, of Paris, whose interesting study relating to the graphic representation of electrical currents and the sinusoidal curve, which have been previously referred to in this journal, communicates to the *Archives de Physiologie* for April a note giving the result of further researches upon the effect of rapidly alternating electrical currents. D'Arsonval has previously shown that with sinusoidal waves of great frequency, neither the nerves nor the muscles are excited, consequently neither pain nor muscular contraction is produced, but great tissue activity is produced, as shown by the great absorption of oxygen and the increased production of CO_2. Changing the form of the waves, each wave produces an electrical shock, and by increasing the number of waves, not only is the number of shocks increased, but the contractions become more and more confused until the muscle remains contracted or tetanized. To produce this condition in human muscle requires from 20 to 30 excitations per second. When the muscle is tetanized, if the number of waves is increased, the intensity of the phenomenon of excitation is also proportionally increased, but this does not continue indefinitely, as might be supposed. A maximum is reached between 2500 and 5000 excitations per second, after which the phenomenon of excitation decreases with the number of electrical oscillations. From this, results the surprising fact that with oscillations sufficiently rapid, currents may be passed through the body without being felt, which would produce most terrific effects if the frequency of oscillations was lessened.

D' Arsonval first called attention to this remarkable fact in 1888; but at that time the apparatus which he employed did not produce alternations of sufficient frequency to suppress the phenomenon of excitation entirely, his machine giving scarcely more than 10,000 excitations per second. He has since, however, by combining this apparatus with that of Dr. Hertz, succeeded in producing alternations at the astonishing rate of several billions per second. D' Arsonval describes three different modes of producing alternating currents of great frequency, as follows: First, the induction coil of Ruhmkorff; second, an alternator made upon the principle indicated by M. Gramme; third, the oscillating discharge of the condenser.—J. H. K.]

1. *The Coil.*—I shall say little of the coil, except that it is a most unreliable instrument, and that one cannot hope to obtain with it more than 2000 excitations per second. This instrument depends upon the presence of a soft iron core, which, while it demagnetizes rapidly, requires, nevertheless, considerable time for magnetization. The time required in magnetization diminishes greatly the number of waves which may be obtained. The waves due to magnetization are, besides, very different from those which are produced by demagnetization. And further, the form of these waves is unknown, and changes when the number is increased.

2. *The Alternator.*—It is necessary to reject completely all the apparatus in which currents are produced by variations in the magnet of iron. This is accomplished by an apparatus, which consists of an inductor composed of a cylindrical bobbin of iron furnished with two large iron cheeks 50 centimeters in diameter. This coil can turn rapidly round its axis mounted upon points. The axis is wound with a thread of insulated copper wire, which is traversed by a constant current polarizing one of the magnets north and the other south. Upon the internal face of these cheeks and near their border are 100 iron pins, which are placed in pairs, leaving between each couple (positive and negative) a free space of about 1 centimeter. In this space there is maintained, by means of a fixed support, a small circular bobbin without iron, having the form of a disk, and constituting the induction circuit. By placing the large bobbin in motion, each pair of poles which passes in front of the fixed coil induces a double sinusoidal wave, of which the energy can be graduated for a given

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rate of rotation by increasing the current which creates the inducting magnetic field. With this apparatus it is possible to modify both the number of waves per second and the form of the waves. It has the great advantage of furnishing a variable number of waves without change in the form of the waves. With this apparatus I have been able to produce 10,000 alterations per second.

3. *Discharge of the Condenser.*—This is the method employed by Dr. Hertz to

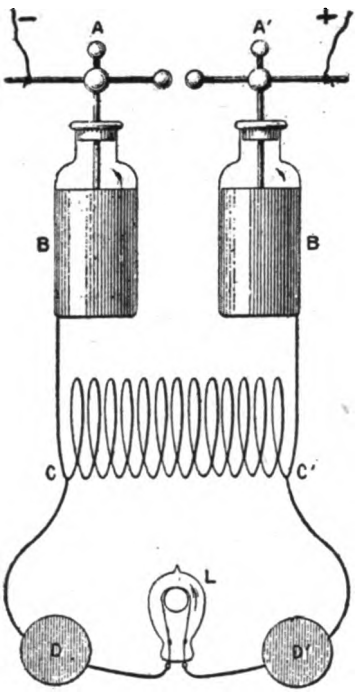

Fig. 1.

produce extremely rapid electrical undulations. The phenomenon was discovered by Feddersen, and studied more than forty years ago by Helmholtz and Sir Wm. Thomson, who discovered the mathematical law relating to it, which is as follows: If a Leyden jar is discharged by means of conductors, two very different cases may present themselves, according to the relative value of the capacity (C) of the coefficient of self-induction (L), and of the resistance (R) of the system. If we find $R > \sqrt{\frac{4L}{C}}$, the discharge is continuous; in a contrary case, it is oscillatory. In the case of the oscillatory discharge, the oscillations are isochronous, and their amplitude decreases in a geometrical ratio. The movements of a liquid in communicating jars will represent what occurs with the Leyden jar. According to the resistance offered to the movement of the liquid, the surface of the liquid finds a position of equilibrium, slowly and without rising above the point of equilibrium, or there may be a series of oscillations with decreasing amplitude. The duration and number of oscillations may be measured by examining the discharge by means of a turning mirror. When the resistance is so slight as to be negligible, the duration of an oscillation is given by the formula of Thomson, $T = 2\pi\sqrt{LC}$.

We may consequently give to T, values more definite by modifying L and C. Dr. Hertz has obtained one billionth of a second; and my friend, M. Potier, has been able to lower the oscillating period so as to give to the Leyden jar a musical sound perceptible to the ear. In my first experiments, I employed a Hertz vibrator. Later I employed the more powerful arrangement suggested by MM. Elihu-Thomson and Tesla. In my recent researches I found great advantage in the exclusive employment of the following apparatus, of which the experiments of M. Lodge have given me many suggestions: Let A A' (Fig. 1) represent the armatures of two Leyden jars wound in cascade. The armatures are joined to an electrical apparatus of high potential (as a Holtz machine, Ruhmkorff coil, or transformer). The external armatures B B' are joined together by a solenoid C C', composed of coarse copper wire making fifteen or twenty turns. Each time a spark passes between A A', an oscillating current of extreme energy is produced in the solenoid, so that by connecting its extremities, C C', a current is produced which may bring to a white light a strong incandescent lamp held between two persons, D D'. The spark which is obtained between C C' is much longer than that which passes between A A'. This is due to the fact that in the latter case the discharge of the external armature B B' occurs suddenly, while that of the internal armature A A' is slowly developed, the difference in potential between the poles increasing until the spark passes. In these conditions the position of the solenoid plays a secondary rôle, while its self-induction becomes preponderant. The

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effect of these sudden discharges is analogous to those facts in mechanics relating to the action of instantaneous forces. A piece of gun cotton placed upon a piece of steel burns slowly if lighted, but will break the piece if made to explode by means of fulminate of murcury. The same amount of energy, however, has been set free in the two cases; but in the second the pressure generated by the gas is so intense that the resistance of air becomes comparable to that of steel. It is the principle illustrated in the difference between the electrical pressure developed gradually in A A′, and on the contrary, suddenly in C C′ at the moment when the jar is discharged. If it is desired to increase the tension of the current, it is sufficient to introduce into

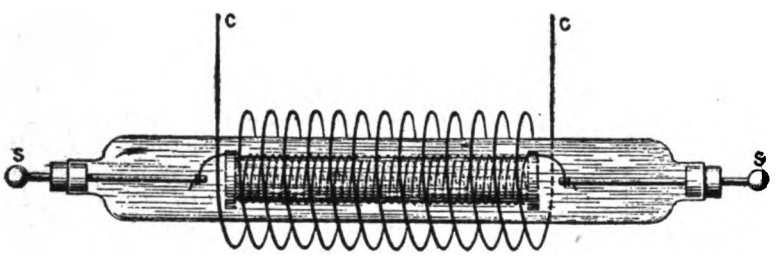

Fig. 2.

the solenoid a bobbin with a large number of turns. This bobbin is placed in a tube of glass filled with oil (Fig. 2) which insulates it completely.

Physiological Effects of Currents of Great Frequency.— We may utilize in two different ways the currents thus obtained: First, by passing them directly through the tissues; secondly, by placing the tissues on the interior of the solenoid without making any communication with it. In the second case, the tissues placed in the solenoid are the seat of induction currents of extreme energy. They act like conductors closed upon themselves, and are traversed by induced currents of great intensity. From a physiological point of view, the effects obtained are the same in the two cases, and are chiefly as follows: First, no effect upon the general sensibility and muscular contractility. This is the most striking phenomenon. We have currents capable of burning to incandescence a series of electrical lamps. These lamps placed between two persons, D D′ (Fig. 1), completing the circuit, are lighted without producing any sensorial impressions. The current is very strong. A little heat may be experienced at the points of entrance and exit of the current from the body. I have been able to pass through my body, currents of more than 3000 milliamperes, when currents of a quantity ten times less would be extremely dangerous if the frequency in the place of being 500,000 to 1,000,000 per second were lowered to 100 per second, the usual rate of alternating currents employed for medical purposes. There has been much anxiety for an explanation of these paradoxical results to which I first called attention in my lectures at the College of France and at the Society of Biology. In my communication to the Society of Biology I suggested two hypotheses: 1. Whether these currents, on account of their enormous frequency, pass exclusively upon the surface of the body (it is well known that ordinary currents of great frequency do not penetrate but flow upon the surface of the conductor, as does static electricity); 2. Whether the sensory and motor nerves are organized to respond only to vibrations of determined frequency, as we see, for example, in the case of the optic nerve, the terminations of which are blind to the undulations of ether of a rate less than 497 billion (red), and greater than 728 billion per second (violet).

The acoustic nerve is in the same situation as regards sonorous vibrations. Below and above certain vibratory periods, musical sounds no longer exist, and the ear remains insensible to these vibrations. The human body does not behave like a metallic conductor. Currents of great frequency, in the place of flowing on the surface of the body, penetrate into the body and influence nerve centers deeply situated, both directly and by producing induced currents. Whether these currents are direct or induced, the sum total of the energy which traverses the body remains the same, and the result is the same in both cases. By employing a current of great

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frequency, the body is traversed without showing any reaction by currents, the energy of which would destroy it if the frequency were lowered. We can explain this innocuousness by the absence of excitations, or better still by supposing that these currents exercise upon nerve centers and muscles the remarkable special action studied by Brown-Sequard under the name of inhibition. Experiments in fact demonstrate in the most striking manner this inhibitory action of currents of great frequency, as we shall now show.

1. The tissues traversed by these currents become rapidly less excitable to ordinary excitants. This diminution shows itself by a remarkable analgesic effect produced at the point where the current penetrates the body. This analgesia persists, according to the case and subject, from one to twenty minutes.

2. The vaso-motor system is powerfully affected. If, for example, the mercurial manometer is placed in the parotid of a dog, the arterial pressure is observed to fall several centimeters under the influence of this form of electrization. We may observe the same phenomena in man by the aid of a sphygmograph. There is then manifest inhibition of the vaso-motor system aside from all conscious sensation. This fact proves that currents of great frequency penetrate deeply into the body, as I have stated above.

3. Continue the currents a sufficiently long time in man, and the skin becomes reddened and is covered with perspiration, a natural consequence of the action of the current upon the vaso-motor centers. The same result is obtained by placing the subject upon an insulated stool in communication with one of the poles of the high potential bobbin (Fig. 2), the second pole being in communication with a metallic plate supported at a sufficient distance from it. The patient is thus submitted to the action of an oscillating electrical field.

4. By submitting an entire animal to these currents, either directly or by placing it in the solenoid, we may observe an increase in the intensity of the respiratory combustion. The thermometer shows that there is no increase in the internal temperature. The excess of heat produced is lost by radiation and evaporation, as may be observed by placing the animal in one of the calorimeters which I have briefly described.

5. To discern the action of these currents in a living cell, I have employed the yeast of beer, and in collaboration with M. Charrin I have studied the bacillus pyocyanic. These last researches will be the object of my next communication.

The results which I have briefly indicated, and those already obtained in clinical experiments, give me the hope that we possess in these various forms of electricity, important therapeutic resources. For many years I have studied the action of physical agents upon the phenomena of life, and I hope that these experiments will serve to show objectively that the alliance of science and physiology permit us to-day to establish a clearly defined science under the name of Biological Physics.

New Treatment for Chloasma.— Prof. Unna treats freckles, chloasma, acne, rosacæa, scars, and other disfigurations of the face by removing almost the entire thickness of the epidermis by means of remedies which produce an effect similar to a blister. The method is termed "ecorchement." Two mixtures are employed, the first consisting of the following: —

℞	Resorcin	40 grams.
	Oxide of zinc	10 "
	Anhydrous salicylic acid	2 "
	Lard	20 "
	Olive oil	8 "

The patient is instructed to apply this ointment several times a day. At the end of three or four days, the skin will be found dry and chapped.

The second mixture should then be applied, which consists of the following paste: —

℞	White gelatin	4 grams.
	Oxide of zinc	3 "
	Glycerine	5 "
	Distilled water	8 "

Apply while hot, and cover with lint. In a few days the epidermis becomes detached, and may be removed together with the dried paste by snipping the edges with a pair of scissors. This remedy is painful, but it is said to be quite successful; it has been used in the St. Louis Hospital, Paris.

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Constant Current for Sciatica.— M. Rouveix calls attention to the fact that different cases of sciatica require different modes of treatment. This is especially true as regards cases of acute sciatica accompanied by severe pain, and chronic sciatica, of which the leading symptoms are difficulty and stiffness of movement. For acute sciatica, the descending continuous current should be employed. By this means the pain may be relieved. Subsequently, the ascending current may be used.

In cases of chronic sciatica not accompanied by pain, the ascending current should be employed. In cases in which the acuteness of the attack has not yet wholly subsided, this treatment may at first increase the pain.

Successful Treatment of Ozæna.— M. Moure, of Bordeaux (*Bulletin Generale de Therapeutique*), reports success in the treatment of ozæna, by means of solutions of nitrate of silver and chloride of zinc applied with an atomizer. The nitrate of silver is used in the proportion of ten to twenty-five per cent, the chloride of zinc, from two to ten per cent. The application is made every day or every other day. The author observed improvement in many cases at the end of a month. In some cases it is necessary to continue the treatment for a number of months. In cases in which the disease is confined to the nasal cavity proper, a radical cure may be expected. Cases in which there is considerable more secretion, are more readily cured than those in which the surfaces are dry.

Non-Alcoholic Treatment of Disease.—In the last number of the *Asclepaid*, Benjamin Ward Richardson, M. D., F. R. S., gives a report of his first year's experience as superintendent of the London Temperance Hospital, in which he has treated, during the year, 200 cases of acute and chronic disease, embracing all the forms of maladies which are commonly treated in hospitals, such as diseases of the lungs, heart, digestive organs, nervous system, genito-urinary organs, rheumatism, typhoid fever, etc. As regards results Dr. Richardson says:—

"I am satisfied that no aid I could have derived from alcoholic stimulants, as they are called, could have bettered my results. I have acted on the principle of doing to others as I would they should do to me, and I feel sure any candid medical brother who will have the steady courage to put aside many old and unproven, though much practiced methods, based only on unquestioning and unquestioned experience, and remove into these new fields of observation and experience, will, in the end, find no fault with me for leaving a track, which, though it be beaten very firmly, and be very wide and smooth to traverse, may not, after all, be the surest and soundest path to the golden gate of cure."

Flies in Cholera.—Sabtchenko, Grassi, and Cattani have shown that Koch's cholera bacillus may adhere to the bodies of flies, so that these insects which escape the regulations of quarantine may disseminate the disease. During the recent epidemic of cholera at Kieff, the author conducted some experimental researches in the laboratory of Prof. Podvissotski for the purpose of determining the possible influence of the excreta of flies in the dissemination of cholera. The author caused flies to swallow both pure cultures of cholera bacillus, and the dejections of cholera patients, with the following results:—

1. Cultures prepared from the excrements of flies passed two hours after the flies had swallowed a portion of the pure culture of cholera bacillus contained a small number of Koch's bacilli in addition to numerous saprophites.

2. The excrement of flies taken from 6 to 24 hours after they had swallowed the culture, gave cultures which contained a larger number of cholera bacilli, and a smaller number of saprophites.

3. Control experiments made with the excrement of flies which did not swallow the cholera bacilli gave negative results. The author found the cholera bacillus in the excrement of flies three days after the flies had swallowed the culture. The bacilli thus obtained from the excrement of flies gave very virulent cultures. From these experiments, it is evident that the fly may be a very important factor in the dissemination of cholera, and that, in cholera times, at least, one should be very careful never to swallow food which may have been contaminated with the excreta of flies.

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Glue for Surgical Dressing.— The following preparation should be applied to the gauze or muslin bandage as quickly as possible, and should be thoroughly rubbed in.

Oxide of zinc	10 parts.
Gelatin	30 parts.
Glycerine	36 parts.
Water	30 parts.

Influence of Calcined Magnesia.— Sulphate of magnesia, bicarbonate of soda, sulphate of soda, borate and citrate of magnesia and salycilate of bismuth, when investigated have the following results: —

Calcined magnesia does not effect the germ. Borate and citrate of magnesia has some value as a germicide. Salycilate of bismuth killed the germ when in the proportion of one part to one hundred.

New Methods of Resuscitating the Drowned. — Prof. Laborde, of Paris, has recently called attention to the fact that traction upon the tongue is one of the best means of restoring the respiratory rhythm in cases of asphyxia. It is only necessary to seize the tongue with a napkin or a pair of forceps, open the mouth, and pull the tongue as far as possible, then allow it to recede, and repeat the operation at about the same rate as a person ordinarily breathes. If successful, the person operated upon will soon give a deep sigh, which will be followed a few seconds later by restoration of normal breathing. Sometimes it is necessary to continue the submersion traction upon the tongue for several minutes after respiratory movements begin.

Relation of the Cholera Germ to Food Substances. — M. Lavronovich, an eminent Russian bacteriologist, has been making a careful study of the relation of various foods and drinks to the comma bacillus, and with the following results as to fruits: —

1. In the fresh juice of the cherry the bacillus dies in nine seconds. In the sterilized juice of cherries it lives a longer time; however, the germ was found to be dead after it had remained 24 hours in the sterilized juice of cherries.

2. In the juice of grapes, whether fresh or sterilized, the bacillus perished in 15 seconds.

3. The cholera bacillus sowed upon morsels of muskmelon and watermelon gave, at the end of 24 hours, colonies of active and living microbes. The same result was obtained with the fresh juice of these fruits.

The bacillus was found to live a much longer time in beer and ale than in the fresh juice of fruits.

A very active antiseptic substance may be obtained by mixing together one part of tar and one part of carbonate of soda, or of wood ashes and 35 parts of water. After thorough mixing, filter. The same proportion of tar may be used two or three times in the preparation of this liquid.

Diseases of First Dentition.— At the Academy of Medicine in Paris, a discussion recently occurred upon the subject of the diseases of first dentition. The question under consideration was, Are these disorders physiological or pathological? M. Magitot had previously maintained the absolute falsity of the doctrine which has been held from the days of Hippocrates down to the present time, relating to the disorders which occur during the dentition of infants, and declares that they should be erased from the category of medical nosology. MM. Constantin, Paul, Peters, and others attacked this position; but it is still stoutly maintained by Magitot, that the first dentition is a purely physiological act, and the new-born infant is not necessarily an invalid. He protests most vigorously against the idea that at the moment of the eruption of the teeth, the gums should be the seat of any traumatism, wounds, or laceration. He discards the barbarous practice of incising the gums of the teething infant, and finally appeals to comparative pathology. He maintains that domestic animals as well as the human infant present, in the early weeks of their existence, symptoms which are entirely similar to those which are attributed in man to dentition, save that dentition is not present. He maintains absolutely his first position, in which he denies the existence of maladies of dentition.

M. Magitot's views were still combated by M. Charpentier, but his views seem to us to be based upon facts and maintained by logical reasoning.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Peritonitis from Perforation and the Bacterium Coli Communis.—The *Centralbl. für Bakteriol. u. Parasitenk.*, No. 12, 1892, page 257, publishes the reports of an epidemic of typhoid fever during the winter of 1890–91. Perforation occurred with some frequency. A few suppurations occurred in many instances, resulting in the perforation of the lower part of the ileum. Bacteriological studies were made by the plate method by O. Barbacci, also some direct subcutaneous and intra-peritoneal injections with the exudation in bouillon in white rabbits and rats. Plate cultures were also made from the intestinal contents from the floor of the perforated ulcers in four of these cases. In the cultures from all these cases the bacillus coli communis was present. The same bacterium was present in the blood of the heart of two of them. The diplococcus of Fraenkel was present in three cases, its virulence being destroyed after it had passed through two or three animals. Cultivations of this diplococcus on agar developed poorly, and failed after two or three transferences.

These facts lead to the conclusion that this organism had lost vitality and virulence in the exudation, and consequently its share in the production of peritonitis was not considerable. This supposition was supported by the fact that in three cases this microbe could not be demonstrated. Experiments were also made to differentiate the bacilli coli communis from the bacillus pyogenus fœtidus. The author also mentions that he has produced diffuse peritonitis in rabbits and guinea-pigs by means of the bacilli coli communis in filtered and sterilized diarrhœa stools. Furthermore, in case of peritonitis after perityphlitis, the bacillus coli communis was present in the pus removed during life. P. P.

Typhoid Bacilli in Drinking Water. — Mr. L. Kamen had an opportunity to demonstrate, in Germany, the presence of the bacilli of typhoid fever in an epidemic, in the water supplied to the barracks of soldiers among whom an epidemic had broken out. He followed the method of Parietti, proceeding as follows: Several test-tubes were filled with 10 c.c. of bouillon containing from 3 to 9 drops of a solution, of carbolic acid, 5 grms., pure hydrochloric acid, 4 grms., and distilled water, 100 grms. The tubes were incubated for 24 hours, and to those that remained unclouded 1 to 10 drops of the suspected water was added. If the typhoid bacillus existed, the tubes became clouded, and isolation was made afterward by the plate method. P. P.

Bacterium from Acid Urine.— Dr. Heim recorded in a German medical journal a case of incontinence of urine in a male aged 21, whose family had a history of vesical affection. The urine was acid and contained leucocytes and a particular bacterium. There were no evidences of tubercular or gonorrhœal affections. Cultivations were made with all the antiseptic precautions, and numerous colonies were developed of different sizes, mostly circular, with well-defined edges and of a yellowish-brown color. The gelatine was not liquefied, and the colonies were composed of short rods rounded at both ends. The organism was devoid of motion, formed acids, was strongly aërobic, and was inhibited by the presence of hydrogen. It was found in the urine and the leucocytes therein. It stained with the ordinary aniline solutions in vogue, and also by Gram's method. This fact distinguishes it from a gonococcus. Experiments regarding the general pathogenic action and special properties of this germ injected into the bladder of the animals, were negative. P. P.

Bacteria Coli Communis in Corpses. — Messrs. Wurtz and Hermann hold that the bacillus coli communis is common in the human corpse. They made an examination of thirty-two bodies, twenty-four to thirty-six hours after death, by making gelatine plate cultures from the liver, spleen, and kidneys. This microbe was found in the liver sixteen times, in the kidneys twelve times, and in the spleen six times. The authors lay special stress on the polymorphism of the bacteria, and describe two interesting varieties, which can only be distinguished

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by the shape of the colonies. The interesting point is that one of these bears resemblance to typhoid colonies. As the germ of typhoid fever betrays many notable variations when cultivated on plates, the author thinks it difficult to differentiate the bacillus of typhoid fever from bacteria coli communis. P. P.

Invasion of Sub-cutaneous Tissue by the Diphtheria Bacillus.— A German physician, Dr. C. H. Spronck, examined the bodies of three children a few days after tracheotomy had been performed for diphtheria, and found œdematous tissues around the wound. Sections of these demonstrated a yellowish-red appearance, and small hemorrhagic spots. In two cases the œdema had spread over the clavicles and down as far as the thorax. The wound itself was not covered with any membrane, and had no unhealthy appearance. Cultivation experiments revealed diphtheria bacilli in the œdematous swellings. Such œdema have frequently been found in animals when the trachea has been opened. P. P.

The Bacillus of Soft Chancre.— No. 35, *La Semaine Medicale*, 1892, publishes a report by M. Nicolle and M. Quinquand which states that in every case of soft chancre they have found the bacilli described by Unna and in enormous numbers. The microbe is a germ with rounded ends, usually in chains, and found in the lymph and intra-cellular spaces, not in the cells themselves. They obtain the best result in staining them with phenol and methylene. The cultivation experiments were unsuccessful.

P. P.

The Function of Eosinophile Cells. —Dr. Hankin (*Centralblatt für Bakteriol. u. Parasitenk.*) published an article in which he endeavored to give the results of a close study of the bacteriological changes in the circulating blood. He has come to the belief that the bodies known as eosinophiles are intimately concerned in the process of destroying bacteria. He presents voluminous evidences, based chiefly on experiments made with the blood of rabbits. It is perhaps premature for him to offer his deductions and to form hypotheses on experiments of such blood, as the histology of rabbit blood is not very well established.

Hemorrhagic Bacteria in the Newborn. — Drs. Tavel and Quarvain have reported a case of a premature male child (*Centralblatt für Bakteriol. u. Parasitenk.*) in which the infection of the umbilicus was noted a few days after birth. The tenth day, extensive hemorrhages occurred beneath the skin, with rigidity of the skin of the lower extremities. Death occurred on the thirteenth day. At the post-mortem examination it was discovered that there was double hemorrhagic pneumonia. Hemorrhages had taken place beneath the mucous membrane of the stomach and intestines, beneath the pleura, and under the skin. There were found, by cultivation, numerous streptococci and some staphylococci. The hemorrhages were not due to instrumental interference, as labor had taken place without instruments, and there had occurred nothing in either case to produce it but microbes.

Flies and the Spread of Cholera.— The *Journal of the Royal Microscopical Society* publishes the following interesting account: —

"Dr. J. Sawtschenko, who has been making experiments as to the relation between the spread of cholera and flies, finds that it is easy to demonstrate the presence of cholera bacteria in fly-excrement passed for two or three days after having been fed on pure cholera cultivations. Under these circumstances, the flies — which were ordinary house-flies and bluebottles — were fed, after infection with the cholera-cultivation, on sterilized bouillon. If, however, they were fed on raw meat, a number of saprophytes were mingled with the cholera bacilli. If the flies were fed on intestinal contents of cholera corpses, all sorts of bacteria were demonstrable in their excrement. The cholera bacteria lost none of their virulence during their transit through the fly's intestines; and the experiments further showed that other vibrios retained their virulence under similar conditions and for similar periods (two or three days).

"The author concludes that flies serve not only to spread infection directly, but that each patch of excrement must be reckoned as a further center for the extension of the disease." P. P.

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HYDROTHERAPY.

PRIESSNITZ attracted the attention of the medical fraternity, as well as that of the laity, more than seventy years ago, by the great number of remarkable cures which he effected at his homely water cure at Graefenburg in Austrian Silesia. So great was the interest created by the large number of cures, that multitudes flocked to the Graefenburg water cure from all parts of the civilized world. Water cures sprang up in various parts of Germany, France, England, Italy, and the United States, few remains of which are to be found at the present day in this country, although quite a number of successful hydropathic establishments are still in operation in England and on the Continent. Nothing approaching the popularity attained by Priessnitz has ever been witnessed since his day, however, although a Catholic priest, Sebastian Knipp, has recently been creating quite a furor in Germany by the peculiar methods adopted at his establishment, one of the most curious of which is compelling the patient to walk with naked feet in the early morning and evening through the long grass of dew-covered meadows.

Notwithstanding the many eccentricities of the empirical hydropathist, the mischief now and then done by the unscientific application of powerful hydropathic measures, and the serious blunders not infrequently resulting from a lack of scientific knowledge and the ability to make an accurate diagnosis, the virtues of water as a therapeutic means have been coming to be more generally recognized by the medical profession, until at the present time the leading men of the profession, especially in Germany and France, have come to rely upon this therapeutic measure as one of the most valuable means of combating disease afforded by modern rational therapeutics. The great Charity Hospital, Paris, has a complete outfit for the administration of baths and hydro-therapeutic measures of every description. The same is true of the Salpêtrière and other great hospitals in Paris. In this country, unfortunately, this important therapeutic means is very greatly neglected. We are glad to see that Dr. Baruch, of New York, is doing such excellent service in calling the attention of the profession to the value of water as a therapeutic agent.

The writer has made constant use of hydrotherapy in the treatment of disease for something more than twenty years, and has endeavored to make a careful scientific study of the merits of this agent. He was long ago convinced that there is no means by which the human system may be so profoundly and so quickly influenced therapeutically as by various applications in accordance with a true scientific method. That much harm has been done, and perhaps is still done, by the empirical employment of water, and that little good can be expected from the desultory and haphazard methods of employing this agent, which are in vogue among common people, are facts, the truth of which is abundantly attested by the personal experience of the author, and doubtless that of other medical men. But it is well that the medical profession should know that the empirical hydrotherapy of Priessnitz and his followers was long ago displaced by a timely scientific hydrotherapy, the foundations of which were laid by Currie and Jackson in the last century, although the most impor-

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tant work of developing a truly scientific system was left to be accomplished within more recent times by Fleury, Winternitz, Claude Barnard, Dujardin Beaumetz, Brown-Sequard, d'Arsonval, and others. Much, however, still remains to be done in this important field. Within the last fifteen years the writer has undertaken a large number of experimental inquiries in regard to this agent, some of the results of which will be detailed in future numbers of this journal.

THE NEW TREATMENT OF CHOLERA.

At a mass meeting of physicians held at the Great Northern Hotel, under the auspices of the Practitioners' Club of Chicago, Dr. Elmer Lee read a paper entitled, "Cholera, its Prevention and Treatment. Surgical Irrigation of the Intestines and Peroxide of Hydrogen (Medicinal)," in which some very common-sense views respecting the treatment of this disease were presented. Doctor Lee has had a large experience both in Russia and in Hamburg last year, in the practical treatment of cholera. His observations and experience show most conclusively that this disease is best combated by means of measures which wash out the alimentary canal and thus get rid both of the ptomaines which have been produced by the microbic causes of the disease, and of the microbes themselves. Dr. Lee observes that the Italian method, which consists of washing out the bowels with half gallon doses of boiled water containing tannin, laudanum, and gum arabic, was almost invariably followed by recovery. A description of Dr. Lee's method, which was attended by most remarkable success, is found in the following paragraphs, quoted from the paper referred to:—

"It is now well known that cholera is a disease of the alimentary canal. Its inciting cause is believed to be a germ taken into that canal through the medium of food and drink. There its presence is protested against by the absorbent vessels, which eliminate from the food the nutriment for the body. The first symptom produced by foreign invasion in the intestines is diarrhœa, which may precede vomiting from one to three or even four days. If this be true, the bowels must be the seat of the disorder, and the most direct method of reaching them by medication must be the best. If the stomach could be emptied of the foul material before the poison has passed further, there might be a speedy relief, and, indeed, no real cholera. After it has passed into the intestines, medicine administered through the stomach may be slow in reaching the seat of the disease, and even then can only mingle with the poison, holding out the hope that the one will neutralize the other. This hope, in truth, is seldom realized. But if the poison can be removed from below, the course is left clear for nature to recuperate itself. The diarrhœa is an evidence of the great exertion put forth by the organism to rid itself of the death-dealing agency, and probably it would be effectual in the great majority of cases were it not that the nervous forces of the system are exhausted by the terrible strain before the required evacuation of the bowels is completed.

A large irrigation of hot water, made soapy preferably by neutral liquid soap, introduced into the colon through a suitable rubber tube, is the simplest, and I am prepared to say further that it is a more satisfactory way, of treating cholera than any other with which I am acquainted. The time to begin the irrigation is at the very earliest possible moment. Save the blood every single moment of infection by immediate action, even if there is the faintest suspicion of cholera either with or without diarrhœa. In every post-mortem seen

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by me of cases of death in which there had been no marked diarrhœa, the colon and small intestines were filled with accumulations of choleraic matter which swarmed with comma bacilli. The rule from which there need never be deviation is to treat the patient by irrigation of the bowels and rinsing of the stomach, without waiting for confirmation of the diagnosis either with the microscope or by the culture test. The important thing is to save the patient, even at the expense of fine statistics.

"For internal treatment, my experience taught me that the *medicinal peroxide of hydrogen, of Marchand*, given in cupful doses of the strength of four per cent or even much stronger, was a better antiseptic than any other drug heretofore known in the treatment of cholera. Then the treatment would be, first, immediate irrigations with hot water and soap, using from one to three gallons at a time twice a day for the first and second day; once a day afterward if required, which is seldom the case. At the same time cleanse the stomach with *medicinal peroxide of hydrogen* and hot water used freely — by urging the patient to drink. The feeding and nursing are the same as would be required by a patient suffering from septicæmia or other prostrating disease. My belief is based upon personal experiences, and the following surgical measures and medical treatment, viz., irrigation of the bowels, *always, first*, with hot water made soapy with neutral liquid soap or a good castile-soap; secondly, cleansing and rinsing the stomach with hot water and *medicinal peroxide of hydrogen, of Marchand*, continuing till it is well washed; thirdly, food and nursing; fourthly, *medicinal peroxide of hydrogen of four per cent strength* given in cupful doses at intervals of two hours during the sickness till convalescence; fifthly, meet the requirements as they come up, as would be done in any other grave disease, using whatever personal experience has taught us to believe is good. Cleanse the bowels, wash the stomach, feed the sick, keep them warm if cold, and reduce excessive heat by the cool bath rather than reliance upon drugs; using anything in an emergency that it is the easiest and the most accessible to procure. The cholera patient may be convalescent inside of the first few days, or if not convalescent and not dead, the case goes into the typhoid state, after which convalescence may be deferred for several weeks or death may be the conclusion. The temperature prior to the fifth day is generally subnormal or a little above, but on the fifth day marked exacerbation and elevation of temperature indicates the typhoid condition."

Dr. Lee is of the opinion that the addition of drugs or chemicals of any nature to the solution of soap is of no value in the treatment of cholera. Two or three irrigations will usually be found sufficient. The stomach was also washed in a majority of cases by means of a stomach tube. Dr. Lee recommends that in cholera times the first appearance of diarrhœa should be followed by the use of a large enema, and believes that this means will be found greatly to promote recovery, if it does not entirely deprive the disease of its terrors. In advanced cases, after the irrigation of the bowels, Dr. Lee places the patient in a warm bath. Patients apparently in a state of collapse when brought into the hospital for treatment by this method, sometimes recovered in twelve hours. This method is endorsed by Prof. Virchow, of Berlin, and other eminent German physicians.

This method is so eminently sensible, and constitutes in itself a so thoroughly rational measure of treatment, that it is to be hoped that for all epidemics of cholera which make their appearance hereafter, it may be given a thorough

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trial. It is the belief of the writer that now this simple and efficient means of treatment has been brought so prominently before the public, it will come into universal use, not only in cholera, but in cholera morbus, cholera infantum, and all allied disorders. The writer has been in the habit, for the last fifteen years, of using copious hot irrigations of the bowels in all disorders accompanied by loose and ill smelling stools, having discarded long ago the use of opium and allied remedies. For more than a dozen years our uniform mode of treating the class of cases mentioned (we have had no experience with cholera) has been irrigation with hot water, or hot water with soap, sometimes with the addition of a little turpentine and the administration by this mode of large doses of subcarbonate of bismuth. Sometimes a preliminary dose of some saline laxative has been given to insure a complete emptying of the whole ailmentary canal. In the treatment of these sudden outbreaks of the epidemic of dysentery and cholera morbus, sometimes numbering thirty or forty cases, this method has been found uniformly successful. Copius water drinking has also been used in cases of vomiting, and lavage of the stomach in cases in which the vomiting continued. We have not employed peroxide of hydrogen (Marchand), as recommended by Dr. Lee, but the use of this reliable germicide is certainly so rational that we shall give it a trial when another opportunity occurs.

Dr. Lee deserves great credit for calling the attention of the profession to the simple and rational method which he has instituted for the treatment of cholera and allied diseases; and it is to be hoped that the attention which the subject deserves will be given to it, and that the method suggested will be adopted, not only for cholera, but for other allied diseases which carry off so many thousands annually. J. H. K.

LIMIT OF THE PERIODS OF INCUBATION AND CONTAGION IN INFECTIOUS MALADIES.

THE Clinical Society of London has recently conducted an inquiry for the purpose of determining more exactly the incubation periods of various infectious maladies, and the length of time danger from infection lasts. The results of this inquiry are summarized as follows by *Medicine Moderne*: —

Diphtheria.—The average incubation period is two days, more rarely four days, and occasionally seven days. The virulence of contagion is very great. Infection may occur at any period of the disease, and the disease may be communicated by contaminated clothing or any other objects, for several months after exposure.

Measles. — The incubation period of this disease varies from four to sixteen days. The danger of contagion exists during the whole course of the disease, but disappears very rapidly after convalescence. Danger of transmission of the disease through the clothing probably exists only a short time after contagion.

Scarlet Fever. — The incubation period is very short, rarely reaching six days. The contagious elements persist a long time after recovery, lasting three months at least.

Rötheln (*Rubella*). — The incubation period of this disease is very variable, the average is about eighteen days. The contagion is most active just before the appearance of the eruption, and during its development. The contagion period continues for a short time after the eruption is fully developed.

Mumps. — The incubation period is the same as that for Rötheln. Contagion is greatest during the first three or four days.

Small-pox. — The average incubation period is twelve days; the minimum, nine days; the maximum, fifteen days. Contagion may occur at any period of the disease. Infection may occur through

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personal contact or through the clothing.

Chicken-pox.— The incubation period is fourteen to twenty days. It is less contagious than small-pox, and is greatest during the period of eruption.

Typhoid Fever.— The average period of incubation is twelve to fourteen days; sometimes nine days; occasionally twenty-four days. Contagion may occur at any period of the disease, and even during two weeks after recovery. The contagious elements in the discharges or the clothing remain active for at least two months. J. H. K.

AN EPIDEMIC OF TRICHINOSIS IN BELGIUM.

A RECENT number of the *Journal d'Hygiene* reports an extensive epidemic of trichinosis at Herstal, resulting from the use of lard, which upon examination was found to contain the parasite, as stated in the report, "in colossal quantities." Thirty-nine persons showed symptoms of the affection, of whom thirteen died. The sufferers exhibited the various symptoms of the disease which are manifested in its three features, the diarrhœal, or choleriform; the rheumatoid, or typhoid; and the cachectic. The hogs from which the lard was obtained were native reared; so that it would appear that Belgian as well as American pork is becoming thoroughly infected by this horrible parasite.

Our contemporary recommends that those who eat pork should take care that it is thoroughly cooked. Would it not be better to discard the use of swine's flesh altogether? The hog is a most excellent scavenger, but a very poor article of diet. Nothing could be more horrible than death from trichinosis. The consciousness that one's flesh is the seat of swarming millions of wriggling worms, and that the disease is one for which there is no possible remedy, is one well calculated to give rise to a sentiment of the deepest horror. If a new malady presenting equally terrible and loathsome aspects were to be discovered, the apprehension and terror which would be thereby created, would lead to the immediate adoption of the most vigorous measures for its extermination. But trichinosis has come to be so common a malady, the constantly recurring cases which are recorded scarcely give rise to comment.

This parasite is without doubt rapidly extending its ravages in our country. Probably thousands of persons are carrying about with them in their muscles multitudes of trichina, without being aware of their presence except through the frequent occurrence of rheumatic pains in the muscles, which an eminent German medical authority has recently attributed to this cause. J. H. K.

Eosinophile Leucocytes in Leukæmia.—Dreschfeld and Janowski some time ago expressed doubts respecting the importance of the eosinophile leucocytes of Ehrlich in the diagnosis of the leukæmia of Hodgkin's disease. Both the observers mentioned, assert that increase of these cells is not found in all cases of leukæmia, as claimed by Ehrlich. Kanthack, of Cambridge University, showed last year that these cells are present in numerous conditions, among others, the following: Gonorrhœal pus from abscesses in rabbits, dogs, and guinea-pigs, which is sometimes almost entirely composed eosinophile cells; pus from purulent ophthalmia; pus from phoas abscess and other sources of suppuration in human beings; pus from abscess due to necrosis; sputum of patients suffering from asthma, tuberculosis, and bronchial catarrh; in the tissues of human beings when the seat of non-purulent inflammation; in the muco-purulent nasal secretions; nasal polypi; and in human saliva. Kanthack claims that the eosinophile cells are independent of the spleen, the lymphatic glands, and also of the bone marrow, as shown by experiments upon animals.

J. H. K.

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AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THE Secretary, Dr. Margaret A. Cleaves, sends us the following preliminary program of the American Electro-Therapeutic Association, which will hold its third annual meeting in Chicago, September 12, 13, and 14. We are glad to see that so interesting a program has been prepared. There is a large field for this Association, and the meeting will doubtless be a very interesting and profitable one.

DISCUSSIONS.

1. "What are the Possibilities of Electricity in the Treatment of Fibroid Growths?"

Discussion will be opened by Dr. J. H. Kellogg, of Battle Creek, Mich.

The following, among others, have been asked to take part: —

M. le Docteur Georges Apostoli, of Paris; M. le Docteur Georges Gautier, of Paris; Dr. La Torre, of Rome; Dr. Augustin H. Goelet, of New York; Dr. A. L. Smith, of Montreal; Dr. Franklin H. Martin, of Chicago; Dr. Margaret A. Cleaves, of New York; Dr. G. Belton Massey, of Philadelphia; Dr. George F. Hulbert, of St. Louis; Dr. E. L. H. McGinnis, of New York.

2. "The Influence of Frequency of Interruptions and Character of Induced Current Waves upon Physiological Effect."

Discussion will be opened by Professor J. W. Morton, of New York.

The following, among others, have been asked to take part: —

M. le Prof. d'Arsonval, of Paris; Prof. Du Bois-Reymond, of Berlin; Mr. Newman Lawrence, of London; M. le Docteur Larat, of Paris; Prof. Edwin J. Houston, of Philadelphia; M. le Docteur Apostoli, of Paris; M. G. Weisse, of Paris; Dr. W. J. Herdman, of Ann Arbor, Mich.; Mr. J. J. Carty, of New York; Dr. J. H. Kellogg, of Battle Creek, Mich.; Dr. A. H. Goelet, of New York; Dr. Weir Mitchell, of Philadelphia; Dr. A. D. Rockwell, of New York; Dr. Frederick Peterson, of New York; Dr. W. F. Hutchinson, of Providence, R. I.; Dr. Georges Gautier, of Paris; Dr. Franklin Martin, of Chicago.

PAPERS.

1. "The Nutritional Effects of Statical Electricity." By Prof. W. J. Morton, M. D., New York.

2. "Electro-Medical Eccentricities." By Newman Lawrence, M. I. E. E., London, England.

3. "The Graphic Study of Electrical Currents in Relation to Therapeutics." By J. H. Kellogg, M. D., Battle Creek, Mich.

4. "The Action of the Continuous Current within the Living Tissues as Distinguished from the Local Polar Action." By Prof. W. J. Herdman, M. D., Ann Arbor, Mich.

5. "The Therapeutic Application and the Theory of Alternating Currents." By Dr. Georges Gautier, Paris, France.

6. "The Treatment of Fibroid Tumors with Electricity." By Dr. Georges Gautier, Paris, France.

7. "Induction Coils." By Mr. A. E. Kennelly, of the Edison Laboratory.

8. "Electrolysis in Tumors of the Bladder." By Robt. Newman, M. D., New York.

9. "The Present Position of Electricity in the Treatment of Ectopic Gestation." By A. Brothers, M. D., New York.

10. "Electro-Therapeusis in Salpingitis." By W. B. Sprague, M. D., Detroit, Mich.

11. "Report of a Case of Ascites Cured by Galvanism." By Holford Walker, M. D., Toronto, Canada.

12. "The Primary Action of the Galvanic Current on the Blood. It Increases the Amount of Ozone it Contains as Shown by Chemical Tests of the Blood in the Arteries." By J. Mount Blever, M. D., and M. M. Weil, M. D., New York.

13. "The Conservation of Energy as a Successful Factor in Electrotherapy." By Horatio R. Bigelow, M. D., Philadelphia.

14. "Synovitis Treated by Cataphoresis." By F. H. Wallace, M. D., Boston, Mass.

15. "The Use of Static Electricity in the Treatment of Incipient Insanity." By W. F. Robinson, M. D., Albany, N. Y.

16. "Further Study of Electrical Anæsthesia and Frequency of Induction Vibration." By W. F. Hutchinson, M. D., Providence, R. I.

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17. "The Absorption of Fibroid Tumors by Mild Electric Currents." By R. J. Nunn, M. D., Savannah, Ga.

18. "Some Observations on the Fine Wire Coil or Current or Tension." By H. E. Hayd, M. D., Buffalo, N. Y.

19. "The Treatment of Subinvolution by Electricity." By C. G. Cannaday, M. D., Roanoke, Va.

20. "Successful Treatment by Electrolysis of Four Additional Cases of Œsophageal Stricture with Exhibition of Two Cases." By D. S. Campbell, M. D., Detroit, Mich.

21. "The Treatment of Dysmenorrhœa by the Galvanic Current." By A. Lapthorn Smith, M. D., Montreal, Canada.

22. "Notes upon some Uses of Galvanism in Surgery." By W. B. D. Beaver, M. D., Reading, Pa.

Several other papers of equal interest have been promised, but the titles have not yet been received.

REVIEWS.

The Knee-jerk after Section of the Spinal Cord.—By Edward T. Reichert, Philadelphia. A valuable contribution to the physiology of the nervous system. The author's experiments prove that the phenomena of re-enforcement of knee-jerk are dependent upon nerve centers situated in the cerebrum.

Fixation after Excision of the Knee. —By H. Augustus Wilson, M. D., Philadelphia, Pa.

This paper reports an interesting case of excision of the knee joint, and presents an excellent summary of the known facts relating to the after management of cases of this sort. The author recommends that fixation of the knee be maintained for many months after the operation.

"Arousing the Public."—By C. H. Reeve, Plymouth, Ind. In this paper the writer calls attention to the fact that a criminal class or variety of human beings is being produced through the intermarriage of criminals, and urges that the marriage of tramps, vagabonds, and worthless defective individuals of all classes should be forbidden. A good suggestion.

Sternberg's Bacteriology.—This excellent work, published by Wm. Wood & Co., is the most complete and thorough work ever published on bacteriology in the English language. Indeed, it has no superior, if an equal, in any language. It is called a manual, but is rather a complete treatise, dealing with our knowledge of bacteria to date. It is most excellently gotten up and illustrated by heliotype and chromo-photographic plates, besides about 270 engravings. The book has some 800 pages, and is divided into four parts, the first including classification, morphology, and bacteriological technology; the second treating of the general biology of microbes; and the third and fourth, of the pathogenic saprophytic bacteria. The author has included a great deal of original work of his own, and has given proper acknowledgment to other writers and experimentalists.

The work has not been in circulation very long. Though it seems to have been published in 1892, it was not received at the office of this magazine until two or three months ago. It certainly deserves to be widely known and circulated. There is not a physician interested in the progress of medicine who can afford to do without it. It will supply the wants of any medical man on the subject of bacteriology. It is complete in all its departments. The work does credit to its author, and is certainly an honor to American medical and scientific literature.

P. P.

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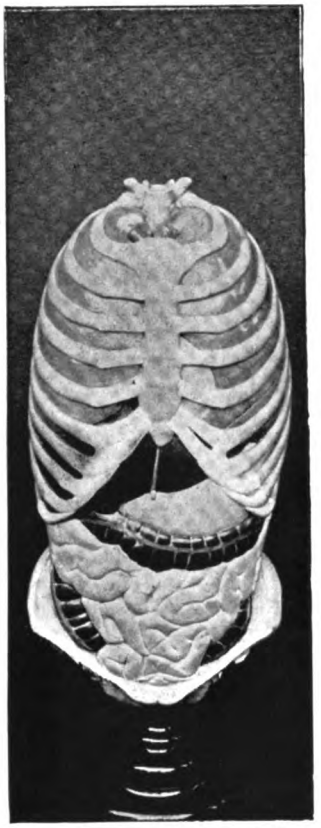

FIG. 1. Normal Stomach Inflated in a Cadaver.

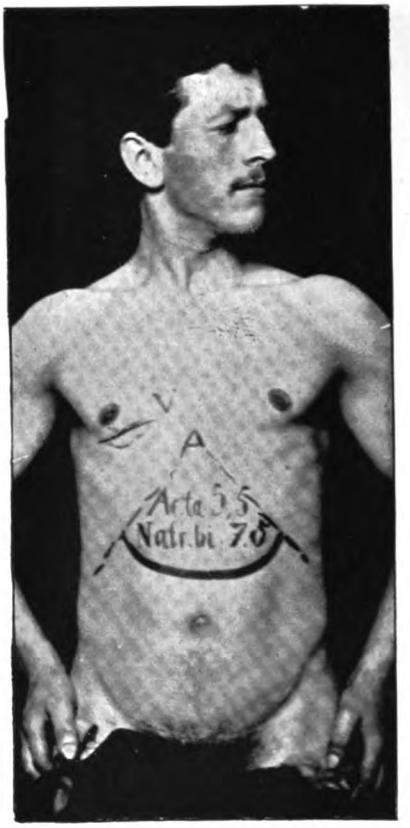

FIG. 2. Normal Stomach Inflated in a Living Man.

FIG. 5—a. The Stomach Empty.

FIG. 5—b. The Stomach Distended.

PHOTO-REPRODUCTIONS ILLUSTRATING ENTEROPTOSIS.

(See article by Dr. Meinert in this number.)

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MODERN MEDICINE
AND
BACTERIOLOGICAL WORLD.

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ORIGINAL ARTICLES.

ENTEROPTOSIS.

BY PROF. E. MEINERT, M. D.
Dresden, Germany.

Nature of the Disease, and Methods of Diagnosis.— Dr. Glenard, a French physician practicing in Lyons and Vichy, first described, in 1885, certain anomalies of position of the abdominal organs, which he termed enteroptosis. He found the condition more frequent in women than in men. The special characteristics of the morbid condition which he discovered, are,—

1. Too low a position of the right flexure of the colon; decrease in the size of the transverse colon from below upward, and from right to left; a sunken and enlarged stomach, and a corresponding change in position of the kidneys, especially the right; prolapse of the uterus, of the liver, and even of the spleen (coloptosis, gastroptosis, nephroptosis, hepatoptosis, and splenoptosis).

Glenard believes that in these anomalies of position of the abdominal viscera he has found the patho-anatomical basis of a number of neuroses, among which he mentions especially general neurasthenia and nervous dyspepsia. For some time his doctrine found no adherents, but later his teachings have begun to attract the attention of physicians, and since 1887 a considerable number of publications have appeared relating to enteroptosis, or "maladie de Glenard." In general, the opinions of the authors of these works have corroborated the discoveries of Glenard; but as regards the causes, frequency, and clinical importance of the anomalies referred to, opinions have differed to such an extent that it seems worth while to undertake a close examination of the facts in connection with a large number of clinical observations. Within the last five years I have verified, in over 500 cases *intra vitam*, and 100 cases *post mortem*, the views of Glenard respecting the position of the intestines. For the larger part of these cases I am under obligation to Dr. Neelson, Prosector of the City Hospital at Dresden.

In order to demonstrate enteroptosis *intra vitam*, Glenard employs palpation. I hardly need to say that palpation enables us to ascertain only the position of certain solid abdominal organs, the kidneys, uterus, and sometimes the liver and spleen, but that this method is not reliable in relation to the hollow organs of the abdomen. The whole subject depends, however, upon an exact determination of the position of the colon. Omitting various uncertain methods which have been recommended as a means of determining the boundary between the stomach and the colon, I will give attention at once to the only method which may claim to be exact, namely, the artificial inflation of the stomach and colon. For the inflation of the stomach, two methods may be employed: —

1. The introduction of air by means of a stomach tube and a pair of atomizer bulbs.

2. The production of carbonic acids in the stomach by means of the successive introduction of two portions of an effervescent mixture.

Both methods are of equal value; I prefer the first in patients accustomed to the use of a stomach tube. In such cases this advantage is offered, that the inflation may be repeated at pleasure without seriously disturbing the patient, and without much loss of time in preparation. This method may also be employed in connection with inspection of the contour of the abdomen (Kelling, 18), but

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the latter method is not reliable, and in most cases is even impracticable, especially in patients who are unaccustomed to the use of a stomach tube. The contraction of the abdominal walls, which are perforated by the retching of the patient, prevent the development of a swelling in the abdominal wall corresponding to the dilatation of the stomach.

The second method can be applied only to patients who are willing to be examined, and has been very generally adopted. If it has not afforded proper information concerning the frequency of gastroptosis, it is only because of the small dose of effervescent powder employed. Most cases of gastro-ecstasis will remain undiscovered if less than 5 grams of tartaric acid and 6 grams of bicarbonate of soda are employed.

I usually prescribe, for women who have borne children, swallowing in quick succession 6 grams (1½ drams) of tartaric acid dissolved in 150 c.cm. (5 ounces) of water, and 9 grams (2¼ drams) of bicarbonate of soda dissolved in 50 c.cm. (1⅔ ounces) of water. (Both solutions should be well sweetened with sugar.) I have found, however, many cases in which even this dose was not sufficient completely to distend the stomach, or produce any visible swelling. I employ less in cases of adults with tension of abdominal walls, and in cases of children I use from one half to one third of the quantity above mentioned. At all events, a sufficient amount of the effervescing mixture must be given, so that every part of the abdominal outline shall be made prominent, and that portion of the abdomen which is not covered by the ribs when touched with the hand usually gives the impression of a distended air cushion. (See Fig 5, frontispiece.)

I dilute the solution of the bicarbonate of soda and tartaric acid somewhat freely, and administer only three fourths of the dose of each, reserving the remaining one fourth to be given later, if the distention is not so complete as desired. The percussion note obtained, if the distention is insufficient, is entirely unreliable; for example, if, as is nearly always the case, loops of the intestines containing air lie close to the stomach, their percussion note will not differ materially from that of the stomach itself. The same is true if fluids are introduced into the abdomen (Teufzoldt, 20; Laube, 21). The border of the stomach is determined by percussion, being concealed by the overlying colon, if it happens to be filled with feces, or if, as is often the case, the large curvature of the stomach is covered with the transverse colon distended with gas.

Some have made the objection (Pacanowski, 22) that the large quantities required by Ziemssen distend the stomach abnormally, causing it to appear to be ecstatic, even when this condition is not present. This objection does not hold, however. The distensibility of a normal stomach is very limited, and if the tension from gas becomes too great, a part immediately escapes through the cardiac orifice.

To what extent the large curvature of a normal stomach is depressed when it is distended to its maximum, is a point which may be disputed. My own opinion is that it never falls below the navel; but the configuration of the great curvature will leave no doubt as to whether or not we have to deal with a case of gastroptosis. If the curve is uniform and slightly convex downward, as shown in Figs. 1 and 2 (see frontispiece), cutting the two costal arches, it is not a case of gastroptosis.

The only objection which can be raised against the systematic employment of distention of the stomach with gas, is the danger which might result from existing lesions in the walls of the stomach. That there is nothing to be feared in a case in which the walls of the stomach are intact, is shown by numerous experiments upon human beings, and also by experiments upon animals, made by Sen (23) and others. Nevertheless, it cannot be denied that in cases of round ulcer or carcinoma, perforation of the stomach walls may be induced by the tension resulting from distention. Of course, patients who are suspected of gastric ulcer will not be subjected to this method of investigation; but this disease sometimes exists without presenting the characteristic symptoms, and I am of the opinion that I have distended many ulcerated stomachs. Nevertheless, in a thousand anomalous symptoms, I have encountered only a single case illustrating this danger, and in this case there was only an insignificant hemorrhage, as indicated by a reddish froth discharged from the stomach. There were no unpleasant

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consequences whatever. I have never heard of a serious case occurring in the

Fig. 3 *a*.

practice of physicians employing this method.

The accuracy of this method increases with the quality of the gas employed, and with the thinness or the flaccidity of the abdominal walls, and the completeness

Fig. 3 *b*.

with which the digestive canal is emptied. If the abdomen is not already distended before the introduction of the gas, if the abdominal walls are not too thick, and if a sufficient quantity of gas can be employed, we may distinctly see the outline of the stomach arising upon the surface of the abdomen directly after the two solutions have been taken in quick succession. A change in the form of the surface of the abdomen, indicating the outline of the stomach, occurs within fifteen seconds after the fluids are swallowed. In Fig. 3 *b* it is the large, and in Fig. 5 *b* (frontispiece) the small, curvature of the stomach, and in Fig. 4 *b* it is part of the pylorus.

In case the abdominal walls remain flat after the administration of the effervescent powder, we have to deal with a case of very pronounced gastrectosis, and

Fig. 3 *c*.

must administer 3 grams (45 grains) of tartaric acid and 4 grams (1 dram) of bicarbonate of soda. The solution should be swallowed very quickly, when the lower border of the stomach will readily appear. If the epigastrium still remains depressed, and the boundary of the stomach cannot be defined, the amount of powder administered has been insufficient. The evidence already afforded is sufficient to enable us to make a diagnosis of gastroptosis, but we have received no information concerning the form of the stomach, and must, for this purpose, develop an additional quantity of carbonic acid gas.

If inspection does not afford sufficient evidence to enable us to determine the contour of the distended stomach, we

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may resort to palpation, which will give us the information desired, even in cases of tense and fat abdominal walls. In case too large a quantity, relatively, of carbonic acid gas has been administered, as indicated by intense pain at the epigastrium, the escape of the gas from the stomach may be facilitated by the introduction of the finger into the upper part of the œsophagus, or better, by quickly introducing a stomach tube. I believe that a passage of carbonic acid gas from the stomach into the intestines, where a proper amount of gas is employed, is takes place with so great rapidity that in cases of flaccidity of the abdominal walls the disappearance of the swelling can almost be seen with the eye. This is the only positive method of determining the position of an empty stomach. (See Fig. 3, *c*.) As a means of outlining upon the abdominal walls the condition of the stomach, I employ tincture of iodine because the reappearance can easily be seen in the photographic reproduction. Distention of the colon cannot be so satisfactorily employed as inflation of the stomach, for the reason that some parts

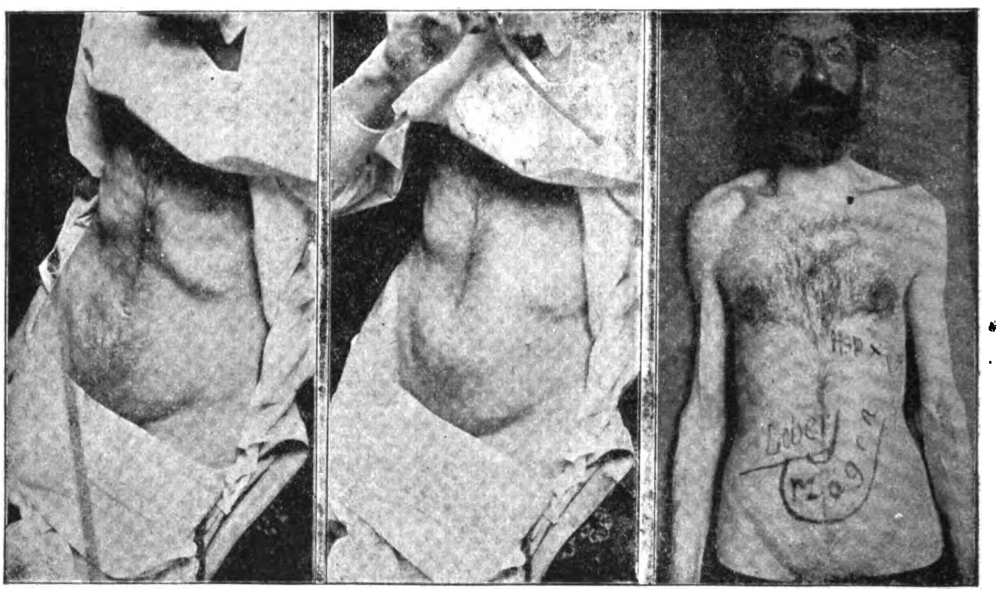

Fig. 4 *a*. Fig. 4 *b*. Fig. 4 *c*.

Fig. 4.—Man aged 54 years. *a*. Appearance of the abdomen with the stomach empty. *b*. Appearance of the abdomen after the introduction of the effervescent powder into the stomach. *c*. Outline upon the skin, indicating the position of the internal organs.

quite exceptional. Kussmaul considers that CO_2 is passed from the stomach into the intestines when loops of intestines containing air appear in proximity to the inflated stomach. This happens very frequently. Kussmaul probably mistakes for CO_2 the residual air which exists in the small loops of the intestines, compressed by the distended stomach. (See Fig. 5, *a* and *b*, frontispiece.)

Carbonic acid gas produced in the stomach by this method of examination is almost always immediately absorbed, and at the end of one half hour at the latest, the epigastric region is as flattened as before the production of gas and the distention of the stomach. Absorption of the colon lie back of the ribs, behind the thicker layers of the abdominal walls, sometimes also behind the liver and stomach. By pumping in as much air as the patient can endure without pain, we succeed in outlining only by means of inspection and palpation the three sections of the colon represented in Fig. 6. The stomach also, when inflated, remains in about the same position, only the size and form changing; while the colon, if filled with gas, considerably changes its position, partly because more space is required, and partly because the decrease of its specific gravity gives to the sunken parts of the colon a tendency to float upward to the higher regions of the peritoneal

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space. In general the transverse colon lies deeper before inflation than afterward, as indicated by my photos of living persons. The colon, loaded with fecal matter, must lie still deeper. In cases of flaccid abdominal walls, and especially cases of pendulous abdomen, we are often able to observe, in consequence of the small resistance, the transverse colon sunken to the symphasis. When inflated, it rises almost to the umbilicus, but afterward settles again, being crowded down by the prolapsed stomach. In cases of tense abdominal walls, however, it presses upon the stomach, especially when filled, after the examination with carbonic acid gas, and dislocates it in an upward direction. (See Fig. 6.)

If we discover the present condition of the transverse colon in time, and if the abdominal walls are sufficiently thin, then the rising of the colon may be prevented by compression with the fingers at the upper border. (Figs. 10, 11, and 12. See article in next number of magazine.)

Finally, distention does not give reliable information respecting the real position of the colon, for, as found in the cadaver (Figs. 17, 20, and 22. See article in next number of magazine), its abdominal convolutions are not placed side by side, but sometimes one upon the other.

Some have also proposed the introduction of the effervescent powder into the colon. This is dangerous. I have heard of a case of rupture of the intestine in consequence of such an experiment. A larger quantity of gas may be developed than the intestine, up to the point where resistance is first met, is able to hold. The distention of the colon above a certain degree of tension weakens the automatic functions of the intestinal walls (V. Ziemssen de Arelio, *Klin. Medicin.*, bd. 33), so that it is impossible, as in the case of the stomach, to obtain a spontaneous expulsion of any excess of gas which may be developed. We must therefore be very careful in the prescription of carbonic acid gas, to regulate its administration properly. The most simple and cautious method is the common air enema, by means of the double bulb syringe. I have used this in all my experiments. The intestines should be first emptied as thoroughly as possible. In simple cases and under very favorable circumstances we can sometimes succeed in securing a visible relief of the ascending, transverse, and descending colon. In a majority of cases, however, we are forced to employ palpation, and even then can usually demonstrate only those portions of the colon represented in Fig. 6.

In cases in which I could not make a clear diagnosis in consequence of the tense condition of the muscles of the abdominal walls, I have been able to obtain the information sought by repeating the examination. It is not always easy to adjust the tube so as to prevent the escape of air. The air moves forward irregularly, even when the syringe is worked with careful regularity. But a depression of the colon may also occur without a slight depression of the stomach or of any other abdominal organ.

Fig. 6.— The circular dotted lines represent the large and small curvatures.

(To be continued.)

Cyanide of Mercury.— At a recent meeting of the Ophthalmological Society of Heidelberg, Dr. Schlosser recommended cyanide of mercury as four times less irritating and in other respects much superior to corrosive sublimate in treating eye affections. He obtains rapid cures by means of this remedy in a two-per-cent solution in cases of acute conjunctivitis.

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THE NON-SURGICAL TREATMENT OF OVARIAN DISEASES.

BY J. H. KELLOGG, M. D.,
Battle Creek, Mich.

(Continued.)

CASE 3.

MISS S., aged 25, arrived at the Sanitarium in a wheel-chair; pale, weak, thoroughly discouraged,—an invalid; had been in bed for nearly three years; for two years had not been able to sit up long enough to take a single meal. The patient was extremely neurasthenic, anæmic to a marked degree, emotional, hysterical, and had constant ovarian pain, which was very greatly increased at the menstrual periods; bowels constipated; gastric and intestinal catarrh. The patient was so susceptible to cold air that she was constantly muffled up in warm blankets, and the slightest draught gave rise to extreme neuralgic pains in various parts of the body.

Examination of stomach fluid showed hyperpepsia. Physical examination discovered no disorder of the heart or lungs, but extreme hyperæsthesia of the abdominal sympathetic; great pelvic congestion, which was indicated by the almost universal throbbing of the pelvic vessels, the uterus being enlarged to more than twice its normal size, and in a state of extreme retroversion, prolapsed; tenderness of the ovaries, both being twice their normal size; extreme tenderness and irritability of all the pelvic viscera.

This patient had been under the care of physicians for many years. For the last two years she had been under the care of eminent metropolitan physicians, who had employed rest cure, and the various methods of treatment commonly adopted in such cases, but without benefit; in fact the patient had steadily grown worse. She was brought to the Sanitarium from a hospital in Chicago, where she had spent some time, but without benefit.

The first prescription for this patient was as follows: Two vaginal douches daily, a warm sitz bath three times a week, revulsive applications to the lower spine daily, massage, some weak sponge baths, general faradization, and a moist abdominal girdle. She was required to exercise a few minutes each day with a wheel crutch, and to go through, each day, a program of daily exercises under the direction of a trainer. Subcarbonate of bismuth was administered for relief of hyperpepsia, together with trunk packs, and galvanism applied over the region of the spine and the solar plexus. Proper dietary was instituted. A little later, manual Swedish movements were added to the prescription as a means of securing more vigorous exercise of the muscles. The patient received very little local treatment, on account of the extreme excitability of the pelvic organs. The uterus and ovaries were replaced once or twice a week, and supported by pledgets. Later a pessary was introduced. As the patient gained strength, she was required to do more vigorous exercises from day to day, and at the end of six weeks her wheel-chair was taken from her and regular walking exercises without the aid of the wheel-chair were instituted. At the end of two months the blood had become normal, the amount of hæmoglobin being 14 per cent, as shown by Henocque's hæmatoscope. The right ovary was still enlarged and somewhat tender, and had a disposition to prolapse; the left ovary was not at all tender, and remained in place.

April 7, less than four months after the patient's arrival, the uterus was normal in size and in position. Neither ovary could be felt. The patient still complained occasionally of pain in the right ovarian region, but had so far recovered that she was able to begin riding the bicycle, and since that time has made steady improvement. At the present time her total strength is 2558 pounds, a gain of more than one thousand pounds. The patient is able to engage freely in exercise, and goes about from morning to night like a well person; rides a bicycle one half an hour twice a day; not infrequently riding seven or eight miles at a stretch without the slightest inconvenience further than an occasional slight return of pain in the right side; but this pain is steadily lessening as she gains in strength. I have every reason to believe that the improvement she has made, and is making, is permanent.

One interesting feature in this case, which I omitted to mention, is the general improvement in the position of the abdominal viscera. When the patient came under treatment, there was general

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sagging of the abdominal viscera; the lower border of the stomach was two inches below the umbilicus. The improvement in the position of the pelvic viscera accompanied a general improvement in the position of all the organs of the abdomen. The bowels are now held well up. The lower border of the stomach is found at a point two inches higher than at the beginning of treatment, and the abdominal walls, instead of being flaccid, are firm and tense.

I think it impossible to cure any chronic case of displacement of the pelvic viscera without curing the displacement of the abdominal viscera, which is invariably present in these cases. A number of years ago I read a paper before the Gynecological Section of the American Medical Association, in which I presented the statistics of a large number of cases in which careful note was taken of the position of the abdominal viscera in connection with various pelvic displacements and other disorders. I showed, in this paper, by statistics and by outline tracings of the figure, made in a considerable number of cases, that the pelvic displacement is, as a rule, only one feature in a general disturbance of the static relation affecting all, or nearly all, the viscera of the lower cavity of the trunk; that is, the study of the bowels, kidneys, often the liver, sometimes the spleen, as well as the uterus and the ovaries. In the several years which have elapsed since this paper was read, I have verified the views presented, many hundreds of times, and at the present time am so thoroughly convinced of the importance of giving attention to the condition of the viscera of the abdomen and the removal of causes which operate to produce visceral prolapse in the abdomen, as well as in the pelvis, that I absolutely refuse to treat any displacement of the pelvic organs in which I cannot institute such treatment as I believe to be essential to the cure of a general visceral prolapse, which invariably exists in these cases.

Case 4.

Miss D., aged 22, came to the Sanitarium a very frail, undeveloped woman, a victim of nervousness, spinal irritation, and a multitude of symptoms, one of the worst of which was the so-called muscular rheumatism. She had never in her life enjoyed good health. Menstruation irregular, accompanied by extreme pain; uterus anteflexed, in a state of retrocession; left ovary prolapsed and tender; profuse leucorrhœal discharge.

The treatment instituted for this patient was as follows: Fomentation to the spine followed by cool saline sponge bath three times weekly; electric bath once a week; massage; general faradization; gentle apparatus work in the gymnasium; manual and mechanical Swedish movements. At the end of six weeks the patient had increased in weight from 86 to 96 pounds, and had gained 500 pounds in strength. Her waist measure had increased one inch. Her countenance, formerly sallow, is now fresh and full of color; cheeks plump; appetite, which was almost wholly absent, is now so excellent that she is obliged to leave the table hungry to avoid overeating. The patient is no longer depressed, but wears a happy, cheerful face, and is "busy as a bee" all day, working for the health and vigor which she already (August) enjoys in greater measure than ever before in her life. I should have mentioned that, in addition to the general measures above mentioned, pelvic massage was administered once or twice a week, and local applications were made of the faradic or sinusoidal current, three times weekly. The effect has been complete relief of the ovarian tenderness and pain.

Case 5.

Miss K., aged 21, had suffered with constant backache; was very nervous; had been for some time a student, but had become so ill that her studies were seriously interfered with; unable to endure any physical exertion. Examination showed extreme tenderness of the spine, retroversion of the uterus, prolapse and tenderness of the ovaries, and, as usual in such cases, prolapse of stomach and bowels. The patient was under treatment for several months, during which time she continued her studies, when her health became so greatly improved that she entered the employment of the Institution as a nurse. The patient now enjoys better health than ever before in her life. Her waist, which had become compressed by tight bands and corsets, expanded several inches as the result of physical culture, and her vigor of respiration increased to such an extent that her waist expands fully six inches in taking a deep

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breath. Her waist measurement has increased four inches. The ovarian tenderness disappeared without the slightest uterine displacement. There is no longer any complaint of backache, and the patient enjoys almost perfectly good health.

CASE 6.

Miss T., aged 22, had suffered constantly from great distress in head; mental confusion; extreme nervousness and lassitude; backache; and severe dysmenorrhœa. The patient had been so long a sufferer that she had lost all interest in life, a fact which was clearly indicated by her dejected and hopeless countenance. On examination I found the uterus and ovaries prolapsed, and the ovaries tender. The patient had worn a corset since fifteen years of age. The waist measure was 23.5 inches; waist expansion with clothing extirely loose, 1.3 inches. The abdomen was sagging, and general visceral prolapse. The patient was so feeble that her aggregate strength was but 832 pounds. At the end of two months' treatment by the methods previously outlined, this patient's total strength was increased to 1600 pounds, or nearly doubled. There was an increase of one and one half inches in waist measurement, and general improvement in every particular. Ovarian irritation, which was very marked at the beginning of treatment, had entirely disappeared. The patient soon entered the Sanitarium Training School for Nurses, and has since done very efficient work as a nurse. She has now followed this profession for four years, and is enjoying excellent health. At the end of one year from the beginning of treatment, and several months after the treatment and training had been discontinued, her aggregated strength was found to be 3031 pounds. Her waist measure had increased to 35 inches. There was a marked gain in the lung capacity, and the patient's entire appearance had undergone so decided a change that she could scarcely be recognized as the same person. The sallow complexion had disappeared, and a fresh, ruddy countenance had taken its place. The air of lassitude and dejection previously worn continually was wholly gone, and an expression of energy, vigor, and cheerful contentedness had taken its place. The increase of strength in the several regions of the body, in this case, was so interesting as to be worth noting. The total increase in strength of arms was from 257 to 855 pounds; in the legs, from 251 to 1058 pounds; in the trunk, from 161 to 7012 pounds; in the chest, from 164 to 406 pounds: by which it appears that the arms had increased in strength 70 per cent; the legs 76 per cent; the trunk 77 per cent; and the chest, or respiratory muscles, 60 per cent. The greatest gain was in the trunk muscles, which I have almost uniformly found to be the case, as this is the weak point with women suffering from displacement of abdominal and pelvic viscera.

CASE 7.

Miss T., aged 21 years, had been a miserable invalid for a number of years. Had suffered extreme pain at the menstrual period; had constant headache, and a great number of neurasthenic symptoms; and was extremely nervous. Examination showed the following conditions: Prolapse of stomach and bowels; movable right kidney; great tenderness in the abdominal and sympathetic, and especially of the renal plexus and lumbar ganglia; the uterus in an abnormal position, but the left ovary prolapsed and exceedingly sensitive; congestion of all the pelvic viscera. The course of treatment was in accordance with the general plan previously referred to, and the patient returned home enjoying perfect health. The ovaries were in position and not sensitive. The stomach and bowels were elevated to nearly their normal position. The right kidney remained in place so long as the patient maintained the correct posture. Her stomach, which had been exceedingly foul, was clean, and the patient was relieved of all her previous symptoms of ill health. Since that time, now some three years, she has been constantly engaged in ordinary household employments without injury. In this patient the total strength increased in three months from 1004 pounds to 2647 pounds. The waist measure increased 2½ inches.

CASE 8.

Miss L., aged 22 years, had for a number of years been a student at a boarding school. At the time I first saw her, she had been for several years a miserable and confirmed invalid; had suffered extremely; general nervous symptoms. I think I have never seen a patient suffer more

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severely from menstrual pains and dysmenorrhœa. She was so reduced in flesh that she was scarcely able to walk; had been under the care of leading New York gynecologists, but without benefit. At the end of twelve months, by careful mental and physical training, she returned home, the picture of health, free from pain, without ovarian tenderness, which had been extreme, and able to walk several miles without injury or discomfort. Two months later she resumed her studies in the advance classical course of a well-known college.

CASE 9.

Miss A., aged 26 years, had been a confirmed invalid for a number of years; had suffered from severe dysmenorrhœa, and the menstrual pain was increasing from month to month. She had become extremely nervous, hysterical, and generally hyperæsthetic. Examination showed tenderness of spine, the whole length; the slightest touch was extremely painful; the same was practically true of all portions of the body. The uterus and both ovaries were prolapsed, and the latter were extremely sensitive. There was also prolapse of the stomach and bowels. In addition to the symptoms mentioned, the patient was subject to very severe headaches, a symptom which I have found very common in these cases. I believe these headaches to be due, however, not to the ovarian disease, but to the accompanying stomach disorder. In the examination of a large number of cases of so-called nervous headaches, or megrim, I have never failed to find dilatation of the stomach with hyperæsthesia of the abdominal sympathetic in more than one or two cases.

The patient was under treatment for four months, during which time physical culture, massage, Swedish movements, hydrotherapy, electricity, and various remedies, the use of which has been previously referred to, were employed, either in conjunction or consecutively, and with the result that at the end of the period named I was able to send the patient home to her friends in excellent health. The menstrual suffering had entirely ceased. The patient's flesh and blood had increased so that she had become the picture of health. There was still a slight ovarian tenderness, but it was disappearing so rapidly that there was every reason to believe it would be entirely gone in a very short time. Unfavorable conditions caused a partial relapse after the patient reached home, but a return to the same methods of treatment resulted ultimately in complete and permanent recovery.

CASE 10.

Miss B., aged 36 years, entered the Sanitarium Feb. 3, 1893. She had never been well; was so weak, anæmic, and emaciated that she was supposed to be suffering from serious lung trouble, for which she had been under treatment for some time. Diagnosis of some pulmonary disease was favored by a night cough. Examination showed the following conditions: Prolapse of the stomach; hyperæsthesia of the left lumbar ganglion and solar plexus; right kidney floating; both ovaries extremely sensitive. Examination of the stomach fluid showed hyperpepsia with fermentation. After less than two months' treatment appropriate to the case, the patient went home improved in every particular; in fact was so greatly changed for the better that she considered herself in excellent health.

CASE 11.

Miss E., aged 24, entered the Sanitarium in August, 1892. She had been a chronic invalid for many years, and had despaired of recovery. Her principal symptoms were general nervousness, exhaustion, good-for-nothingness, and severe pelvic pains. Local examination showed left ovary to be extremely sensitive and prolapsed. The patient remained under treatment a little less than three months, at the end of which time she returned home with no trace of pelvic disease, and enjoying excellent health. This patient nearly doubled her muscular strength while under treatment, the aggregate lifting capacity of the muscles being increased from 1365 to 2350 pounds.

In this case, as in a great majority of cases of this sort, the greatest proportion of gain was in the muscles of the trunk. The gain in strength for the several parts of the body was as follows: Arms, from 414 to 571 pounds; legs, from 674 to 1168 pounds; trunk, from 197 to 451 pounds; chest, from 80 to 160 pounds.

(To be continued.)

LAWSON TAIT is one of the most active anti-vivisectionists in England.

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

THE TRANSMISSION OF MICRO-ORGANISMS THROUGH MILK.

BY DR. FRANZ HAUIGMANN,
Breslau.

[Translated for MODERN MEDICINE from *Zeitschrift für Hygiene und Infectiones Krankheiten.*]

THE question whether carriers of contagion may be secreted in the milk of animals, is one of extraordinary interest, and has led to many researches, especially in relation to cows' milk. The fact that the taking of the milk of diseased animals may produce disease, was known before bacteriological researches were made. We find, especially frequent in medical literature, accounts of stomatitis in consequence of eating unboiled cows' milk from animals affected with foot-and-mouth disease.

As early as 1865 to 1870, experimental researches were made concerning the virulence of the milk of animals fatally diseased with inflammation of the spleen, and murrain. Bollinger seems to have been the first who determined through experiments the virulence of the milk of cows suffering from anthrax; while nearly ten years before, Gerlach succeeded by a longer feeding of his test animals with the milk of murrain-diseased cows, in producing tuberculosis. The same observations were later made by Bollinger, Klebs, Gunther, and Harms, by similar experiments; and Feser produced splenitis by subcutaneous inoculation with the milk of sheep suffering from anthrax, while Manotzkow was unable to find bacteria in the milk of animals suffering from splenitis produced by inoculation, neither could he obtain any result by feeding or subcutaneous injections of this milk in lambs. Chambrelent and Moussous were, however, able to establish the presence of bacilli of the characteristic thread-shape form in the milk of a sheep suffering from splenitis, as the result of inoculation, which died 21 hours after inoculation. In the same case, the milk of the sheep proved to be virulent, as was clearly shown by the inoculation of guinea-pigs. Pernice and Scagliosi obtained a secretion of the bacilli in milk by the intra-venous injection of guinea-pigs with the bacillus anthracis, although in seven similar experiments a negative result was obtained.

Besides the above experiments, experimental researches have been made by Semmer, Peuch, and Toussaint, but Peuch alone obtained a positive result.

After the discovery of the bacillus tuberculosis, feeding experiments were supplemented by experiments with inoculation. May injected under the skin and in the peritoneal cavity of guinea-pigs, milk of cows diseased with murrain, but in only one case, in which there was disease of the udder, did he obtain a positive result. Bange was more successful in his experiments, securing a positive result in every case. He was also able to demonstrate the presence of tubercle bacilli in the milk of cows. In these cases, however, the udder was found to be completely sound in but one instance. Stein found the milk of cows diseased with murrain virulent in only 4 out of 14 cases of intra-peritoneal injection. Bange was more successful in his experiments. He mainly considered the question whether disease of the udder be necessary or not, in order to produce the transmission of tubercle bacilli. He found that milk from the sound parts of the udder, as well as from diseased parts, in cases of udder tuberculosis, was capable of producing tuberculosis when fed to animals. He also found that the milk of tuberculous animals, without tuberculosis of the udder, sometimes contained bacilli, and was virulent, and sometimes was free from bacilli and not infectious. The same experimenter subsequently injected the peritoneal cavity of rabbits with milk of 28 tuberculous cows without udder disease, but produced tuberculosis only twice. Similarly, the milk of eight tuberculous women proved to be non-infectious when tested by inoculation.

Recently, Hirschberger has published a work treating of the infectiousness of milk of diseased cows. Pure milk not contaminated with blood was taken with septic precautions in some instances from the udder of slaughtered animals by means of a Pravaz syringe, and sometimes being obtained before killing the animal. With this milk, guinea-pigs

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were inoculated intra-peritoneally. The milk was found to be virulent in 11 out of 20 cases, the animals suffering from miliary tuberculosis of the peritoneum, spleen, and liver. Tubercle bacilli were found only once in the milk, the udder being at the same time diseased with tuberculosis. Positive results were also obtained in cases in which the udder was wholly sound.

In the same year, Ernst made similar researches and experiments with 36 tuberculous cows presenting no symptom of udder disease. In 114 examinations of milk taken from different cows, the microscopical evidence of tubercle bacilli was found in only 17 cases. Inoculation experiments with rabbits and guinea-pigs showed the milk to be infectious in 28.57 per cent of the cases.

From this brief summary, it is clearly shown that tubercular and splenitic bacilli may be transmitted through the milk of animals affected with these diseases.

Some other experiments have been made for the purpose of determining whether bacteria are capable of passing from the blood into the secretion of the mammary glands. Wissokowitsch injected rabbits with cultures of micrococcus tetragenes and bacillus cuniculicida, but was not able to prove in either case, the existence of bacteria in the milk. Pernice and Scagliosi, however, obtained, in four cases, by injection of a bitch with staphylococcus pyogenes aureus, and of guinea-pigs with bacillus anthracis and bacillus subtilis, a secretion of the injected microbes through the milk, while other experiments entirely failed.

Finally, I wish to mention some cases in which milk has been found to contain bacteria without the possibility of the transmission of the germs from the blood of an animal into the secretion of the mammary glands. Krueger, who examined bacteriologically the milk of a cow diseased with inflammation of the udder, and suspected also of murrain, found neither tubercle bacilli nor other microorganisms peculiar to milk, but a cluster of cocci, from which, by inoculation, the cultures proved to be staphylococcus pyogenes aureus. Krueger, therefore, charges the latter with being the cause of the inflammation of the udder. Furthermore, Lehmann reported, at the 17th Assembly of the German Society of Public Hygiene, experiments by which it was proved that cows' milk contains germs which have found their way into the udder, and especially those parts which were first deprived of their contents. Leopold Schulz, who, at Lehmann's suggestion, made researches relating to the origin of milk bacteria, found that after thorough disinfection of the udder, and of the hands of the milker with sublimate, followed by washing with sterilized water, one c. cm. of the milk contained from 200,000 to 400,000 microbes. He investigated, further, whether this great number of microbes could not be explained by the supposition that the germs accumulated in the ducts of the mammary glands, and proved by separate examination of the first and last portion of the milk, that very great difference in the number of fungi was observable. Similar experiments have been made with the goat, with the same result.

RELATION OF THE CHOLERA BACILLUS TO FRESH FRUIT AND OTHER FOODS.

DR. A. KOENYOEKI furnished the following article to *Klinische Hydrotherapie* :—

The Board of Health of the German Empire publishes the following results of extensive experiments concerning the relation of the cholera bacillus to fresh fruit and some other foods :—

Fruit.— 1. The bacillus of cholera exposed to the cut surface of sour fruit, as currants, raspberries, cranberries, billberries, sour cherries, Italian peaches, or apples, remained vital from one to six hours, the vitality of the bacillus increasing according to the order in which the fruits are here named. On sweet fruits, as strawberries, gooseberries, pears, and plums, the bacillus retained its vitality from one to five days; on apricots, twenty hours; on cucumbers, from five to seven days. In these experiments the bacilli and the fruit were kept at the same temperature.

2. At a temperature of 37° C. the relation of the bacillus to sour fruit remained the same; on sweet fruit the vitality of the bacillus was as follows: On cherries, six hours; on pears, from five hours to four days; on plums, from six hours to two days, on cucumbers, from three to four days.

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3. The cholera bacillus exposed on the cut surface of dried fruit (without specification of temperature) died in less than one day on cherries, apricots, plums, and currants, and within two days on peaches.

4. Under the influence of sunlight the bacillus died, on white currants, in one and one half hours; on cherries and plums, in two hours; on apricots and red currants, in five hours.

5. In a moist state the bacillus remained vital on the surface of the above named fruits from one to two days.

Beverages.— The cholera bacillus died in white wine after five minutes; in red wine and apple wine, after fifteen to twenty minutes; in different kinds of beer, after from one to three days; in cold tea, after one hour; in a smaller quantity of tea, only after one to four days; in cold coffee, after two days; in cold coffee with the addition of rye and chickory, after five hours; in milk, after twenty-four hours; in milk boiled, one hour, only after ten days.

Tobacco.— The bacillus died on the moist end of a cigar after seven hours; on chewing tobacco and rolled tobacco, one to one and a half hours; on snuff, after one day.

Sweetmeats.— On almonds, chocolate, sugar, etc., the cholera bacillus died after twenty-four hours; on biscuit, after one to four days.

Bread and Butter.— On fresh slices of coarse rye and white bread, the bacilli remained alive, if the bread was uncovered, from one to one and a half days; if the bread was kept under a glass bell, the bacilli sometimes remained active for a week. On the surface of slightly rancid butter they remained alive, under different circumstances, from four to six days; in the inside of the butter, from one to two days.

Fish.— On salted and smoked herring the bacilli remained active less than twenty-four hours; on fresh flounders, haddock, and carp, sometimes from one to three days.

Effelmann has also made experiments in this line on different objects, and has obtained the following results: —

On printing paper the bacilli remained active at least seventeen hours; on letter paper inclosed in an envelope, twenty-three and one half hours; on postal cards, twenty hours. On copper and silver coins and on all metallic plates, the cholera bacilli perished in a very short time,— from twenty to thirty minutes. On dry materials, linen or woolen, they remained active from one to four days; on wet or moist linen, they increased, which is proved by their being found in great numbers on places which had not been protected.

Flies remained infectious at least two hours after having been in contact with moist cholera substance, and would infect meat or milk, if the occasion offered. On dry human skin, the cholera bacilli remained alive at least one hour, but never two hours.

All these experiments prove that the cholera bacillus possesses a greater vitality than many at first believed.

Influence of Bicarbonate of Soda on Digestion.— Dr. Gilbert communicates, to a recent meeting of the Biological Society of Paris, the results of experiments which he has made upon dogs for the purpose of determining the influence of bicarbonate of soda on the digestive process. He used two solutions consisting of five and twenty grams of bicarbonate of soda to a liter of water, respectively. His observations were as follows: 1. The large doses of bicarbonate of soda taken at meal time gives the gastric contents an alkaline reaction, which remains for half an hour, and then becomes acid. During the first fifteen minutes there is an increase in the total chlorine; during the first half hour, while the contents of the stomach are alkaline, combined chlorine is entirely absent, but makes its appearance when the stomach contents become acid. 2. The evident effect of the bicarbonate of soda is to delay the digestive process for at least half an hour. 3. Small doses of the same compound produce similar, though less, effects, reducing the acid of the stomach contents, the effect continuing for three fourths of an hour after the dose is taken. 4. When the soda is administered after or before a meal of meat, it results in producing a considerable increase in the production of hydrochloric acid. Prof. Hayem showed that small doses of bicarbonate of soda, administered before a meal, increased the amount of total chlorine and free hydrochloric acid, but that the opposite effect was produced if the soda

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was administered in large quantities during or after the meal. 5. The experiments have resulted in showing that bicarbonate of soda is a useful remedy in cases of hypopepsia, if administered in small doses before meals; and that it is also useful in hyperpepsia, if administered in large doses at or after each meal.

Automatic Regulation of the Digestive Process.— J. Winter, of Paris, whose researches in connection with those of Hayem have added so much to our knowledge of the normal digestive process, recently communicated to the Cabinet of Science, Paris, the results of researches which have been in progress for some time, the purpose of which has been to discover the law or principle by which automatic regulation of the digestive process is effected. Prof. Winter claims to have made the discovery that during all its various stages the digestive process is controlled by the difference between the osmotic tension of the fluid of the stomach and that of the blood plasma. According to these observations, the blood plasma plays a very important part in the process of nutrition, regulating not only the digestive process, but the nutrition and all the life processes of the body.

Operation for Shortening the Round Ligaments.— M. Chalot, of Toulouse (*Bulletin Generale de Therapeutique*), describes what he terms a new method of shortening the round ligaments of the uterus. The following are the different steps of the operation: —

1. The inguinal canal is opened its entire length.

2. The ligament is carefully dissected out, carrying the dissection to the internal ring, and, if necessary, into the peritoneal cavity.

3. The ligament is sutured throughout the entire length of the inguinal canal.

No pressure is employed after the operation, and no assistant is required to hold the uterus in position during the operation, as practiced by Dr. Alexander.

We are not able to see anything new in the mode of operation described, neither can we commend the operation. Opening the inguinal canal throughout its entire length is a wholly unnecessary procedure. A slight puncture with the point of a knife sufficient to admit a strabismus hook, is all the opening required. The method which we have employed in nearly 300 cases, is the following: —

An incision from one half to three fourths of an inch is made nearly parallel with Poupart's ligament, and so placed that the upper end of the incision will coincide with the lower border of the internal inguinal ring. The incision is carried down to the tendon of the external oblique; the wound is made to gape by retractors; a small puncture is made with the point of a small scalpel, from one half to one fourth of an inch below the internal ring; a hook made for the purpose, somewhat similar to a strabismus hook, but larger and stronger, is introduced through this opening, and the ligament is picked up and drawn out. The loop thus formed is woven into the external oblique by means of an aneurism needle. The needle is inserted at a point about an inch and a half internal to the internal ring, passed under the tendon for a distance of about an inch, and made to emerge at a point near to that at which the loop of ligament emerges from the canal. The needle is then withdrawn, dragging back with it the free end of a thread, the other end of which is attached to the loop of ligament, and the ligament is thus woven into the tendon after the same fashion that the housewife weaves in the yarn in the darning of a stocking. Before weaving the ligament into the tendon, a suture is passed through the skin at the upper end of the wound through the deep fasciæ, then through one side of the small wound in the tendonous covering of the canal. Then the thread is passed on through the thickest portion of the ligament, emerging through the opposite side of the opening in the canal through the deep fasciæ of the same side, and finally through the skin. Another suture is passed through the wound from three eighths to one half an inch farther down, which includes the short end of the loop of ligament and makes a dip into the floor of the wound. When the sutures are tied, the cavity of the wound is entirely obliterated, so that drainage is not required. At the end of five or six days the sutures are removed. This method is expeditious and thoroughly reliable. The writer has frequently performed the operation for both sides in seven or eight minutes, and sometimes the entire time

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required for the operation upon both sides is not more than five minutes. The operation very rarely indeed exceeds ten or twelve minutes, and can be done without administering ether, a hypodermic injection of cocaine being sufficient in ordinary cases. The writer generally employs ether, however, for the sake of expediting the operation, as one must necessarily proceed somewhat more slowly when the patient is not under an anæsthetic. When the operation is performed in the manner indicated, complete success may be expected in at least ninety-five per cent of all cases operated upon, provided a proper selection of cases is made.

Influence of Nervous and Muscular Exertion on Temperature.— Prof. Bouchard, in a discussion before the British Association for the Advancement of Science, calls attention to the fact that the slightest muscular exertion is sufficient to raise the temperature several degrees in a patient who is already suffering from fever, as in a typhoid convalescent. He also calls attention to the fact that mental and nervous influences frequently cause a rise of temperature. The visits of friends, in surgical cases, not infrequently cause a rise of temperature. Opposition to the treatment on the part of the patient has a similar effect. A child that had violently resisted the employment of the thermometer was found to have a temperature of 109.9°, as determined by a thermometer in the rectum.

The Influence of Fatigue upon Stomach Digestion.— Salvioli recently examined the effect of fatigue from muscular activity upon the gastric juice of fistulous dogs. The secretion of gastric juice was induced in dogs which had been starved for twenty-four hours, by causing them to swallow indigestible cheese and stroking the mucous membrane with a glass staff, the hydrochloric acid being taken up by the absorbent, and not introduced through the fistula. After some hours of work, the absolute quantity of gastric juice, as well as the amount of solid substance which it contained, and the amount of hydrochloric acid, were found to be decreased.

The digestive power was also proportionately decreased. Small cylinders of albumen inclosed in little bags and passed into the stomach through the fistula, were wholly dissolved in resting dogs in three hours. In dogs at work, the cylinders were scarcely one half dissolved. Similar results were obtained by artificial digestion in an incubating oven, employing the gastric juice obtained through the fistula. A short time after the cessation of work, normal gastric juice is again secreted, and milk or boiled albumen then introduced into the stomach is passed into the duodenum more quickly than usual.

Hydrotherapy in Gynecology and Obstetrics.— Dr. Edmund Tuszkay, of Buda Pesth, commends hydrotherapy as being the most important of all the natural agencies which may be employed in the treatment of disease. He believes the therapeutic value of water to be based upon its efficiency as a means of regulating the temperature, and thus controlling nutrition and functional activity, of which he considers temperature the natural index. He considers hydrotherapy of especial value in gynecology and obstetrics. The writer attaches special value to exciting sitz baths, which he divides according to temperature, into very cold, cold, and lukewarm, the characteristics of the temperatures being, respectively, 45 to 59, 60 to 77, and 79 and 80 to 88. In the treatment of pelvic exudates, he obtained excellent results from very cold sitz baths of five to ten minutes' duration, followed by the hot vaginal douche. In cases in which cold baths are contra-indicated, equally good results are obtained by a protracted warm sitz bath followed by a very short cold douche, with the ice-bag, the cooling coil, and other refrigerative means, in appropriate cases.

Chlorate of Soda for Cancer of the Stomach.— Dr. Brissaud, of Paris, recommends chlorate of soda in eight to sixteen gram doses for twenty-four hours, as a remedy in cases of cancer of the stomach. He was led to this by observing the beneficial results obtained from using chlorate of potash, or soda, in the treatment of cancer and cancroids of the face and mouth. Many cases in which this treatment was employed were greatly benefited. In several cases reported from his own practice and that of others,

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the disease seemed to be cured by the use of this remedy. Prof. Lepine calls attention to the danger of using large quantities of chlorate of potash, or soda, in consequence of the injury likely to occur to the hæmoglobin of the blood. The dose mentioned ought not to be exceeded.

Scrofulous Neck.— Prof. Clifford Allbutt read before the late meeting of the British Medical Association a paper in which he maintained that enlargement of the glands of the neck is almost always due to peripheral irritation, the seat of which may be not only the mucous membrane of the mouth, but also of the throat or ear. The disease is, according to Dr. Allbutt, allied to bubo and to the enlargement of the mesentery gland, which occurs in cases of tuberculosis and typhoid fever. Dr. Dowson has shown that the liability to scarlet fever diminishes with the diminution in the size of the tonsils, which decrease with age. The same is true with diphtheria and other maladies which enter the system by way of the tonsils. Scrofulous neck is probably due in most cases to the entrance of pathogenic microbes by way of the tonsils. The way for the entrance of one germ may be prepared by the work of a preceding germ, as, for example, the germs of consumption may follow those of diphtheria.

Tuberculosis in Goats. — Until recently the idea has prevailed that goats enjoy immunity from tuberculosis; but Colin and Nocard have recently succeeded in inoculating goats with this disease. Similar experiments have also demonstrated that dogs possess no immunity against tuberculosis, as is generally supposed. M. Cadiot has recently collected forty cases of tuberculosis in dogs. In most of these instances the disease was contracted by the dog through association with human beings. Likewise, a tuberculous dog living in close communion with human beings, might easily communicate the disease to persons with whom it comes in contact, especially to children.

Contagiousness of Cancer. — M. Chazin, director of the Laboratory of the Charitie Hospital of Paris, has recently published the results of his experiments, which he has undertaken for the purpose of settling the question of the contagiousness or non-contagiousness of cancer. His experiments go to show that while auto-inoculation generally succeeds, the disease is not usually communicable from one animal to another, even in those of the same species. Nevertheless the evidence which has been brought forward to show the disease to be due to pathogenic microbes, is so conclusive that the infectious nature of the disease must be considered fairly well established.

Germs in Mineral Waters.— Dr. Haynes, of Chicago, has been analyzing mineral waters sold in that city, and finds all of them to contain more or less germs; however, very few of them contain a sufficient number to be considered deleterious. The water which does not contain more than 50 to 200 germs per dram is considered pure. Dr. Haynes has also examined Chicago water and finds not less than 8000 germs per dram in any instance, and sometimes more than 30,000 per dram, which would amount to a quarter of a million of germs in every ounce of water, and more than 30,000,000 per gallon.

Dyspepsia and Tuberculosis. — Prof. Hayem, of Paris, has recently shown that there is a marked association between dyspepsia and tuberculosis in a great number of cases. The disorder most commonly present is simple gastritis. As the digestive disorder usually occurs first, and paves the way for the pulmonary disease, it is important that disorders of digestion should receive prompt attention.

Heterogeneous Personality. — This abnormality has been newly defined by Dr. Smith Baker as a "condition in which the characteristics of ancestry are not blended into a perfect unity." These are the cases in which double consciousness, conflicts of character and personality, and various character transformations occur. Dr. Putnam, of Boston, believes that the treatment of such conditions should consist of a systematic development of the character.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

The War of the Microbes.—MM. D. Backer and J. Bruhat recently presented to the Society of Biology, of Paris, a work in which they undertake to show that it is possible, at least in certain infectious diseases, to combat one specific microbe by means of another. Some intimations of the results of the researches of these men have previously been made public, but in this volume they give a complete resumé of the remarkable investigations in which they have been engaged during the last twelve years.

One of the most interesting observations made by these gentlemen, is the fact that the cells of yeast are capable of acting in precisely the same manner as polynucleated phagocytes. These cells not only absorb microbes, but destroy them, as is shown by the fact that they lose their property of coloration by blue aniline. They have also shown that the presence of neither the diphtheria coccus nor the bacillus of diphtheria interferes with the transformation of sugar into alkaline carbonic acid gas by the yeast germ. The authors find in these facts an explanation of the beneficial results obtained in the treatment of diphtheria by means of yeast. They suggest that the invertin and the diastase produced by the yeast cells antagonize the toxic diastases produced by the diphtheria microbes which paralyze the leucocytes of the blood, and thus destroy their ability to combat the invading microbes, while the yeast cells actively attack the diphtheria microbes in the same manner as do the leucocytes and other cells which possess the functions of the phagocytoses.

J. H. K.

Gas Forming Microbes in Urine of Cystitis.— The *Centralbl. fur. Bakteriol. u. Parasitenk.*, xii, page 745, declares that Dr. Schow (extract from the *Journal of the Royal Microscopical Society*) has "isolated a micro-organism which he calls coccobacillus aerogenes vesicæ, from a case of compression myelitis. There was incontinence, cystitis, and the urine had a peculiar sulphurous odor. The reaction was faintly acid, and the deposit contained bladder epithelium, white blood corpuscles, and some bacteria. The latter consisted of cocci and short, thickish rodlets, stainable with the usual aniline dyes and not decolorized by Gram's method. The micro-organism was cultivated on plates by mixing some urine with meat peptone gelatin. The colonies were small, round, and yellow. The gelatin was not liquefied, and the most characteristic result was the formation of a considerable quantity of gas, which, from analysis, appeared to be CO_2.

"That there was some causal connection between the cystitis and this bacterium was probable, from only one other micro-organism being found; but this was demonstrated to be an accident, and unconnected with the peculiar odor.

"Coccobacillus aerogenes vesicæ is not pyogenic, as experiments on animals showed. The author's account does not shed much light on the sulphurous odor — the special inducement to examine the urine bacteriologically." P. P.

Putrefactive Processes in the Large Intestines.— In the Archives of the Bacteriological Society of the Imperial Institute of Medicine, at St. Petersburg, Vol. I, pages 497–516, Dr. Zumft describes experiments instituted to ascertain by the method of decomposition of albuminoid substances *in vitro* by the microbes that inhabit the human colon, says the *Journal of the Royal Microscopical Society*.

"The general plan was roughly to imitate the natural conditions, and with this intent an infusion of finely chopped meat was, after sterilization, inoculated with some fresh excrement, rendered semi-liquid by mixing it with 1 c.c. of water. The flask was then emptied of air, filled with carbonic acid, and incubated at the body temperature.

"The chief result from these experiments appears to be that putrefactive processes take place slowly in the absence of air and the presence of carbonic acid. After several days — sometimes after several weeks — all the material is not decomposed. This is in conformity with the fact that all the fermentations proceed more slowly without, than in the presence of air.

"From among these putrefactive bacteria the author isolated a facultative anerobic microbe capable of decomposing albumen and sugar in the presence of

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air. It forms little round colonies in gelatin and gelose. In hanging drops the cells appeared to be mobile. The bacteria were found to be pleomorphic, and exhibited great variation in size. It was easily stained by aniline dyes, but was decolorized by Gram's method."

P. P.

Penetrability of the Skin by Microbes.— Dr. B. Wasmuth, says the *Journal of the Royal Microscopical Society*, "finds that the healthy, uninjured skin of man and animals is penetrable by microorganisms, and that the path of access lies between the shaft and the sheath of the hairs, the sebaceous and sweat glands not allowing the entrance of infection. Experiments were made by rubbing pure cultivations of staphylococcus pyogenes albus and aureus into the skin of the hand and arm with the middle finger of the opposite hand. Staphylococci and erysipelas cocci were rubbed into rabbits, guinea-pigs, and white mice, and virulent anthrax into guinea-pigs.

"Most of the experiments made by the author on himself with the staphylococci appear to have been successful, as foci of suppuration, in the center of which hairs stood, appeared after inunction. Nearly all the experiments made with the staphylococci on animals were failures, but all the anthrax inoculations took. Sometimes the cultivations were mixed with lanolin before inunction, and this vehicle did not seem to interfere with the action of the microbes in any way." P. P.

Toxic Properties of Alcohol.— Prof. Richert, of Paris, has been making a careful study of the physiological and toxic properties of alcohol and ether. He reports that he finds the toxic properties of these substances to be in inverse ratio to their solubility in water. A fish exposed to the influence of a four-per-cent solution of ethylic alcohol died within an hour. The same effect was produced by one half of one per cent of amylic alcohol, which is much less soluble than ethylic alcohol. The less the solubility of the poison, the less rapidly can it be removed from the body. These interesting facts, which we glean from the *Medical Week*, we hope to supplement in some future number by a full account of Prof. Richert's investigations.

J. H. K.

Vaccination against Cholera.—Klein has been prosecuting some very interesting experiments upon a guinea-pig in relation to immunity against cholera. His experiments have developed the remarkable fact that inoculation with the bacillus coli and with bacillus prodigiosus and other organisms or sterilized cultures of microbes, produces immunity, by the vaccination method of Haffkine, equally as well as with the organisms of cholera. No explanation has yet been offered for this remarkable fact. J. H. K.

Lotion for Acne Rosacea.— The following lotion should be painted over the congested surfaces daily for three days in succession, care being taken to first excise and empty any pus cells that may be present, and to cleanse the parts thoroughly with soap: —

℞ Resorcin.....15 gr.
Ichthyol.....30 gr.
Collodion.....1 oz.

This lotion is for external use.

The collodion cracks and peels off after the end of five or six days. The application should be repeated several times. J. H. K.

Iodol for Eczema.— Prof. Chatellier, of Paris, uses for moist eczema, iodol, after washing the parts and bathing with warm corrosive sublimate lotion (1:5000). After the iodol is applied, the parts should be carefully covered with cotton wool. In cases of dry eczema, after cleansing the parts, apply an ointment consisting of fifteen grains of iodol to one ounce of lanolin. Paraffin oil may be used in place of the lanolin when greater fluidity is desired. J. H. K.

Dr. H. Vincent communicates to the "Annals of the Pasteur Institute" a paper in which he calls attention to the frequent association of typhoid fever with the streptococcus. These microbes are found to grow together without interference, and development in a case together gives rise to strepto-typhoid septicæmia with characteristic symptoms.

J. H. K.

Recent observations have shown that after the first ten to fourteen days, the symptoms in typhoid fever are due to pus-producing germs rather than to the specific bacillus of the disease.

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THE RATIONAL THERAPEUTICS OF TYPHOID FEVER.

KOCH'S discovery has clearly established the dependence of typhoid upon the development within the alimentary canal of a specific bacillus. Murchison observes that typhoid fever is usually preceded by a gastro-enteric catarrh. Boyd, of Dublin, has recently maintained that a gastro-intestinal catarrh is the principal cause of typhoid fever by preparing conditions favorable to the development of the specific bacillus which, as is well known, is frequently found present in the water, in the soil, and in the human intestine, although producing apparently no interference with health.

The investigations of Roux, Nouvard, and other bacteriologists have shown very clearly, as the writer believes, that the so-called typhoid bacillus is really but a modification of the bacillus coli communis, which is constantly present in great numbers in the human intestines. It seems to be only necessary that the bacillus coli should be subjected to an acute inflammatory process to be converted into a most malignant agent for the production of suppurating and septicæmic processes. Numerous cases have come under the writer's observation which seem to accord entirely with this theory respecting the predisposing influence of a gastro-intestinal catarrh, and the relation of the bacillus coli to typhoid fever. The most recent investigations show that the morbid process in typhoid fever, so far as Eberth's bacillus is concerned, is completed in about two weeks. At the end of this period, if convalescence is not established, the patient begins to suffer from a new set of morbific agencies; namely, pus-producing microbes and the toxines produced by them.

In the light of the new knowledge afforded by bacteriological researches and the development of physiological chemistry, typhoid fever can no longer be regarded as a disease which is uncontrollable by treatment, and which must be left to run its course, under the expectant plan of management. No one nowadays thinks of allowing a patient with typhoid fever to go on day by day with a temperature four to six degrees above normal without employing other remedies than placebos to combat the morbid process. According to Dr. G. Thompson, of New York, the expectant plan showed a death rate ranging from 17 to 40 per cent, a result which certainly does not offer encouragement to the physician to settle into a state of innocuous desuetude in the presence of this malady.

The indications for therapeutic interference in this disease seem to be very clear, and may be briefly stated as follows: 1. To lessen heat production and increase elimination, at least during the first week or ten days of the disease; 2. To eliminate the toxines produced by the specific microbe upon which the disease depends for its characteristic features, and the toxines resulting from the development of the suppurative bacteria of various kinds in connection with the typhoid bacillus; 3. To limit, so far as possible, the development of the invading microbes in the alimentary canal.

In meeting the first of these indications, Brand obtained excellent results from the use of the cold bath, reducing the mortality in a series of more than five thousand cases to 3.9 per cent. Bouchard has modified the method of Brand advanta-

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geously as follows: Instead of placing the patient in a cold bath, he is immersed in water at a temperature one or two degrees below that of the body. The temperature of the bath is reduced 1° every ten minutes until it reaches 86°, never lower. This keeps the patient in water at a temperature below that of the body for a considerable period without at any time producing the phenomena of reaction, and hence avoiding the augmentation of heat-production, which is the chief objection to Brand's method. A method which we have found advantageous, and which is perhaps as effective as any of those mentioned, is the application of sheets wrung out of hot water and wrapped about the patient. Sponging with hot water, the application of fomentations to the spine, and in cases in which the surface is cold, employment of hot blanket packs, are also measures which we have found advantageous. The effect of applications of this sort is at first to reduce heat production as the result of the reflex action set up by the contact of warm or hot water with the surface of the body. The body is cooled by the greater amount of heat brought to the surface by the blood in the dilated blood vessels. By subsequent evaporation the surface is cooled, and thus heat elimination is further promoted. We thus have a decrease of heat production with a coincident increase of heat dissipation.

The second indication, which requires the elimination of the ptomaines and other toxic products of microbic action, is best met by the internal administration of water in large quantities, both by the mouth and the rectum. Our usual prescription is half a glass of water every hour by the mouth, and large enemas administered in such a way as to bring the water in contact with the whole colon two to four times daily. By this means the alimentary canal is emptied of germ-breeding material, and great quantities of microbes and their products are carried off; at the same time the portal circulation is flooded, the action of the liver and kidneys is promoted, and the fever-producing toxines are both destroyed and eliminated.

The third indication is to be best met by means of an aseptic diet and the administration of aseptic or germicidal drugs. No one would think of administering beef or flesh food in any form to a patient in the early stages of typhoid, and yet many practitioners are so inconsistent as to administer beef tea and beef juice in large quantities, while at the same time they withhold beef, mutton, and other forms of flesh food. They forget that beef juice or beef tea contains all the objectionable elements of flesh food, with little or none of the really nutritious and comparatively wholesome elements. Flesh food is fever-breeding because it contains toxic substances, the product of tissue disintegration, excrementary materials on their way out of the system of the animal; and because it furnishes the most fertile kind of soil for the development of pathological microbes and their characteristic toxines and ptomaines. Eggs are thus declared objectionable on the same ground, and in our opinion, milk must also be regarded as not the most wholesome article of food for a typhoid fever patient. We say this while fully aware of the fact that its general use by physicians in typhoid fever will doubtless lead to a general dissent from the view expressed. Nevertheless, the readiness with which typhoid bacilli develop in milk, producing all its characteristic morphological features and its specific ptomaine, typho-toxine, very clearly suggests the propriety of substituting some nutritious and more appropriate article of diet for typhoid fever patients. The principal reason, perhaps, why milk is recommended in these cases, and is so generally used, is the ease with which it can be administered. But modern study of dietetics has shown very clearly that milk

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is by no means the most easily digested food for adults, and the bacteriological fact to which we have just called attention seems sufficient to condemn its use. Kumys is better than milk, on account of its being more easy of digestion and because it has less tendency to form gas in the intestines. We have found lactated milk still better.

In typhoid fever the system requires a considerable amount of carbo-hydrates to support the abnormal evolution of heat and consequent consumption of reserve tissue. It is true that milk contains this element in the form of fat, but we have also in the carbo-hydrates a source for a heat producing element which is easy of digestion and assimilation, and which does not furnish, as does the caseine of milk, a favorable soil for the development of the typhoid bacillus. Starch and sugar are found in abundance in the various grain preparations, which can be easily taken by the invalid in the form of gruel, puree, granola, zwieback, and a variety of other forms. Some juices are also a valuable means of presenting nourishment in these cases; but it is not the purpose of this article to enter into the details of the dietetics of typhoid fever, and we will dismiss this part of the subject with one further observation; namely, that sugar and starch, the chief elements in farinaceous food, constitute the most convenient source from which the liver can obtain its supply of glycogen, which has been shown by the investigations of Bouchard and his pupils to be essential to the ptomaine-destroying function of the liver, a function which it is of the greatest importance to promote and support in typhoid fever as well as all other febrile infectious disorders.

Sir Wm. Jenner has called attention to the fact that excessive feeding is responsible for much of the intestinal trouble in typhoid fever patients, and insists that no more food should be given than can well be digested. Dr. Wallace Beatty, an eminent Irish physician, limits the food to three pints of liquid food in twenty-four hours, and maintains that the limitation of the food to the actual ability of the system to digest and assimilate, is the best means of combating the diarrhœa which constitutes a prominent and troublesome feature in this disease.

Various antiseptic drugs have been recommended for use in this disease. Some of them certainly possess considerable value. An eminent French physician, some years ago, introduced chloroform, administered several times daily, or half an ounce of a one-per-cent aqua solution of chloroform, and with results which seem to commend this remedy to the confidence of the profession. We have used it in a number of cases, and believe it to be valuable. Salicilate of bismuth, naphthol, salol, salophen, and other remedies have been recommended by various observers, the recommendations being comparatively well established by favorable statistics. Dr. Wilks reported more than twenty years ago a succession of 171 cases of typhoid fever without a death. He relied chiefly upon sulphurous acid, which was administered in doses of twenty minims every twenty-four hours, continuing for a week or ten days, or until the patient complains of a sulphurous taste in the mouth and emits from his breath and body the odor of sulphur.

Dr. Yeo, an eminent English physician, recommends chlorine water, which he prepared by placing fifteen grains of powdered chlorate of potash in twelve ounces of water, adding a dram of hydrochloric acid. The bottle should be tightly corked at once. Chlorine (chloric acid) gas is quickly liberated, as indicated by the greenish yellow color assumed by the contents of the bottle. When the action has ceased, pour water into the bottle, two or three ounces at a time, quickly closing the bottle, and shaking and repeating till the bottle is full. This must be used in very small doses. Charcoal, hydro-naphthol, and carbolic acid have also been used. J. H. K.

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THE THERAPEUTIC APPLICATION OF RAPID VIBRATORY MOVEMENTS.

SOME ten or twelve years ago, Charcot, Mortimer Granville, and other experimenters investigated at some length the effects of rapid vibrations, termed by Granville nerve percussion. Granville devised an electrical appliance for producing rapid vibrations, one of which was obtained by the writer and used for some time with some degree of success. Recently the late Prof. Charcot renewed his investigations of this subject, his attention being called to the value of vibration as a therapeutic means, by the reports of patients suffering from paralysis agitans, who said that they experienced great relief from riding in railroad trains or on wagons. These patients stated that during these journeys they were often completely relieved of all painful and unpleasant sensations, and that the relief continued for some time after the journey had ended.

This led Prof. Charcot to construct a chair for the purpose of producing vibrations similar to those produced by the jolting of a railway carriage, or of a wagon. Many patients have since been treated by him and his assistants with the vibrating chair, and with excellent results. The treatment must be administered daily and continued from eight to ten minutes. Good effects are generally most apparent on the day following the application. Gilles de la Tourette has extended the application of this mode of treatment by devising a vibrating helmet by which the vibratory movements are communicated to the skull and its contents. This apparatus, which the writer had the pleasure of testing recently, is said to be of great utility in cases of sleeplessness. The writer has employed vibration in the treatment of disease for more than fifteen years, and for ten years or more has had in use a vibrating chair, the effects obtained by which have often been found to be very satisfactory. Dr. Morselli (*Klinische Hydrotherapie*) has made a variety of experiments with this therapeutic agent in different forms of psychosis, and offers the following summary of the results obtained :—

1. Vibrations may be appropriately applied in cases of psychosis with local symptoms, especially in cases of mental debility with neuralgia.

2. Simple or passive melancholia in the first stage, melancholia with intercostal neuralgia, and insanity with delusions, have sometimes shown a decided improvement upon the application of a vibrating tuning fork either to the forehead or to a painful point.

3. In some cases of hypochondriasis with occipital neuralgia, short periods of relief were obtained.

4. In cases of sleeplessness in persons mentally diseased, vibrations seem to be without effect.

5. In cases of neurasthenia and hysteria, the method was very successful.

6. The effects of vibration were in most cases quite transient, seeming to depend upon suggestion.

7. Vibrations seem to have a marked sedative rather than an exciting effect upon the nervous system. J. H. K.

Chronic Iodism.— In a recent number of the *Hospital Gazette*, Mr. Jonathan Hutchinson, the famous English surgeon, differs from the opinion expressed by some army and navy physicians as to the effects of syphilis upon the muscles, asserting that the great depreciation in muscular energy frequently noticed in many syphilitic cases at least, is not due to the disease itself, but to the prolonged use of iodide of potash. This fact is an important one, to which the attention of the profession cannot be too earnestly invited. The depressing influence, not only of iodide of potash, but of all iodide salts, is well recognized by all authority; nevertheless, physicians

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not infrequently prescribe this drug in large doses, and continue it for months and even years. That the patients should find themselves in a state of muscular and general enervation after swallowing from a half dram to two or three drams of iodide of potash every day for a prolonged period, should not be a matter of astonishment. The success which attends the treatment of this class of maladies at Hot Springs and other places where hot baths are freely used, is not due to the specific virtues of the water employed, but to the fact that the vigorous perspiration induced aids a more rapid elimination of the iodide of potash and other drugs employed, and thus prevents, in part at least, very serious injury from the long exposure of the tissues to the toxic influence of these agents.

The principle involved in this matter is a very important one, and one which has a broad application. There can be no doubt that thousands of people induce chronic and sometimes incurable diseases by the habitual swallowing of patent medicines containing powerful drugs of various sorts. But it is probably unfortunately true also that medical men are not infrequently responsible for the damage produced in the same way through neglecting the fact that drugs are two-edged swords, and capable of producing great injury as well as great good. J. H. K.

Thyroid Grafting in Myxœdema.—A case was recently reported in the Edinburgh *Medical Journal* in which myxœdema of a very advanced and pronounced type, was cured by the ingrafting of a portion of the thyroid gland. The writer has seen great improvement in these cases from the employment of electricity, massage, regulation of diet, baths, and other hygienic means. Improvement has also been reported from the use of the powdered thyroid gland administered by the stomach. J. H. K.

The Policeman's Club.—We are glad to note an editorial article which appeared some months since in the *Alienist and Neurologist*, entitled, "The Deadly Policeman's Club and the Brutal Clubber." Any person who has had any considerable experience in the city dispensary work will heartily agree with Dr. Hughes that science and humanity protest against the "brutalism" of the policeman's club, and that it is high time that "the club" should be abolished and the "clubber" suppressed. It is not an uncommon thing to find men who have been severely clubbed for no offense whatever on their part, except that of finding a bed on some door-step or falling asleep in some narrow passage for want of some better sleeping place. A blow and a gruff order to "Move on" is the brutal sort of sympathy too frequently manifested by the guardians of the public peace in our large cities. The writer has often met men whose heads or shins had been so badly bruised in this manner as to require some weeks of treatment to secure complete recovery. It is certainly time that this brutality should cease.

J. H. K.

The Umschlag for Insomnia.—Late medical journals are publishing an article on the hypnotic effects of warm bandages, quoted from a French medical journal, crediting Alldorfer with the invention of the moist abdominal bandage as a relief for insomnia. The bandage is applied by means of a linen cloth moistened in water and wrapped about the trunk, then covered with oiled silk or rubber cloth to prevent evaporation, and lastly with a flannel to prevent loss of heat. Alldorfer claims excellent results from the use of this remedy for relieving insomnia, his theory being that by the dilatation of the vessels of the trunk, a condition of anæmia is produced in the brain which favors sleep.

It seems not to be known to our medical contemporaries that this method of

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treating insomnia originated not with Alldorfer, but with Priessnitz, the water-cure empiric who created such a great sensation in the early part of the present century, attracting to his water-cure in Austrian Silesia chronic invalids from all parts of the world, and astonishing and puzzling the medical world with the rapidity and soundness of the cures which he effected. Winternitz, professor of hydrotherapy at the Polyclinic at Vienna, employed moist leg bandages from the knee down in addition to the trunk bandage.

Having employed measures of this sort for the relief of insomnia for more than twenty years, and with most excellent results, we feel prepared to commend this simple remedy as far superior to any medicinal hypnotic which has been extracted from coal-tar products or from any other source. The moist abdominal bandage is retained over night. On removal in the morning, the parts should be bathed in cool water, or equal parts of water and alcohol, and a dry bandage should take the place of the moist bandage to be worn during the day.

J. H. K.

Vegetarian Diet in Disease of the Thyroid Gland.— L. Breisacher, of Leipsic, observed that meat extractives produced poisonous effects in dogs upon whom the operation of thyroidectomy had been performed. Ewald found that a removal of the thyroid in pigeons produced no effect whatever upon health. Rabbits were also unaffected by the removal of the thyroid gland. Ewald attributes the differences in thyroidectomy upon dogs and rabbits to the fact that dogs are carnivorous, while rabbits are vegetable eaters. Dr. Thompson argues from this fact, in a recent article in the *New York Medical Journal*, that in cases of grave disease of the thyroid, a meat diet is to be as much restricted as is a farinaceous diet in diabetes, it being clear from the above experiments that one of the duties of the thyroid gland is to destroy the toxic ptomaines and extractives contained in animal tissues.

J. H. K.

Substitute for Senn's Discs.— The ingenious decalcified bone discs invented by Dr. Senn, gave a new impetus to intestinal surgery, and revolutionized the methods employed in this branch of surgery, besides giving rise to a number of new operations which had not previously been attempted. Numerous substitutes for the discs have been proposed, but none, so far as we know, which has offered any real advantages over the decalcified bones. One of the latest substitutes is that suggested by Baracz, which consists of sections made from the Swedish turnip.

J. H. K.

REVIEWS.

A new Illustrated Dictionary of Medicine, Biology, and Collateral Sciences.— P. Blackiston, Son & Co., Publishers, Philadelphia, Pa.

Dr. George M. Gould, already well-known as the editor of two small Medical Dictionaries, has now about ready an unabridged, exhaustive work of the same class, upon which he and a corps of able assistants have been uninterruptedly engaged for several years.

A feature that will attract immediate attention is the large number of fine illustrations that have been included, many of which — as, for instance, the series of over fifty of the bacteria — have been drawn and engraved especially for the work. Every scientific-minded physician will also be glad to have defined several thousand commonly used terms in biology, chemistry, etc.

The chief point, however, upon which the editor relies for the success of his book, is the unique epitomization of old

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and new knowledge. It contains a far larger number of words than any other one-volume medical lexicon. It is a new book, not a revision of the older volume. The pronunciation, etymology, definition, illustration, and logical groupings of each word are given. There has never been such a gathering of new words from the living literature of the day. It is especially rich in tabular matter, a method of presentation that focuses, as it were, a whole subject so as to be understood at a glance.

The latest method of spelling certain terms, as adopted by various scientific bodies and authorities, have all been included, as well as those words classed as obsolete by some editors, but still used largely in the literature of to-day, and the omission of which in any work aiming to be complete would make it unreliable as an exhaustive work of reference.

The publishers announce that, notwithstanding the large outlay necessary to its production on such an elaborate plan, the price will be no higher than that of the usual medical text-book.

A New Hand-book for the Physiological Laboratory.— George Wahr, Publisher, Ann Arbor, Mich.

The most useful book for the student of histology which has ever been placed in our hands, is a little work recently published, entitled, "Directions for Work in Histological Laboratory, for the Use of Medical Classes in the University of Michigan," by G. Carl Huber, M. D., assistant Professor of Histology and Embryology. The work consists of 119 pages of the most condensed, concise, and carefully arranged matter pertaining to the practical work of the histological laboratory. Such a work not only saves the student an immense amount of labor in note taking, but gives him more information and in a more precise form than he could possibly get by taking notes even from the lips of a very able instructor. The book is interleaved with blank pages, intended to be used in drawing the various objects studied. The latest and most approved methods of investigating the various tissues, together with all the technique connected with histological work, are fully described. The student will find here an accurate description of some of the most recently developed German methods, which cannot be found elsewhere in the English language. The directions are so plain and simple that any one who has had any experience at all in laboratory and microscopic work, can, with a good text-book on histology, work out the subject by himself without the aid of a teacher. Such a course might be undertaken with great profit by many physicians whose medical education was chiefly obtained fifteen or twenty years ago, when histology was in its infancy. Wonderful light upon almost every branch of normal as well as pathological histology has been developed within the last fifteen or twenty years, even within the last ten years; and especially in relation to the histology of the blood, which Ehrlich has worked out with such thoroughness and with such marvelous results. Every physician who wishes to keep himself abreast of the progress of rational medicine, needs to acquaint himself with these researches; and there is no work with which we are acquainted which opens the way before him so clearly as does this work by Prof. Huber. The profession at large, as well as the prospective members of the medical profession, are greatly indebted to the author of this little work for the painstaking task which he has performed in gathering together in such a compact and lucid form so great a mass of valuable information pertaining to the technique of histological investigation.

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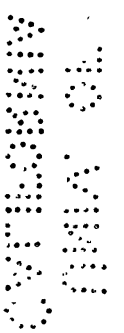

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Fig. 10.

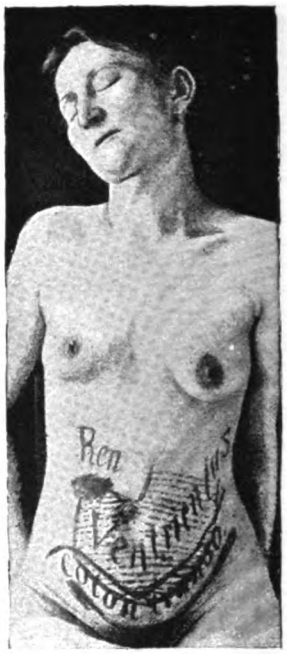

Fig. 11.

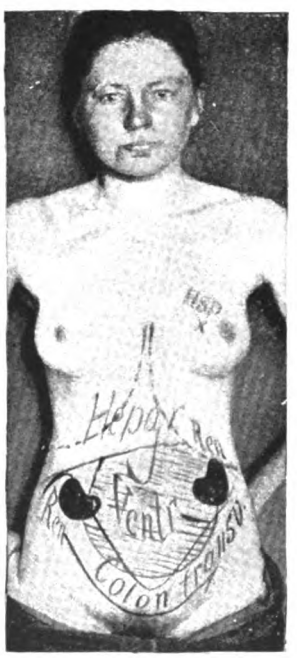

Fig. 12.

Fig. 13.

PHOTO-REPRODUCTIONS ILLUSTRATING ENTEROPTOSIS.

(Meinert.)

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MODERN MEDICINE
AND
BACTERIOLOGICAL WORLD.

VOL. II. BATTLE CREEK, MICH., U. S. A., OCTOBER, 1893. NO. 10.

ORIGINAL ARTICLES.

ENTEROPTOSIS.

BY PROF. E. MEINERT, M. D.,
Dresden, Germany.

(Concluded.)

THE examination of the solid abdominal viscera, to which we must now turn our attention, is made in accordance with rules which are generally acknowledged. I will only mention, in regard to the pancreas, that this gland, normally situated behind the stomach, is in cases of gastroptosis no longer covered by the stomach, and may be palpated as a cord which runs transversely across the vertebral column. Glenard's transverse cord of the colon depends upon a change in the position of the abdominal viscera which renders the pancreas palpable. I shall present, together with the results of experiments which I have made with living persons, those which I have gathered upon the dissecting table. The number of published dissections in cases of enteroptosis is remarkably small. According to Ewald, there were, up to 1890, only four cases. Since then, another case has been added by Kreg (14).

Anatomists are familiar with mal-position of the abdominal viscera, and attach special importance to the frequency of the vertical stomach and the sunken transverse colon in women, but they appear never to have observed the simultaneous existence of the prolapse of other abdominal organs. Virchow (25) only mentions the discovery of the simultaneous dislocation of the stomach and of the transverse colon.

The frequency with which enteroptosis appears, naturally leads to the question: Why has the disease been so long overlooked on the dissecting table? I would like to mention, first, as a cause of this oversight, the general practice of dissecting the stomach and the intestines last. The original site of these organs is thus disturbed, in consequence of the preceding examination of all the other organs. To determine and record the position of these organs immediately after opening the abdominal cavity, is considered a useless method, because we have been accustomed to look upon these deviations from the natural order as incidents without any clinical importance. Finally, the physician whose attention has been directed toward these matters, is troubled in making his post-mortem diagnosis, on account of post-mortem changes, which may be so great as entirely to obliterate the conditions recognized during life. (Compare Fig. 4, preceding article, with Figs. 8 and 9.)

In the small number of cases which I have had an opportunity to examine after death and in which I had, during life, clearly established the presence of enteroptosis, I have obtained the following results: First, the diagnosis of enteroptosis may be positively made during life by the methods of investigation which have been pointed out, and is always confirmed by the autopsy. The position of individual organs in the living person suffering from enteroptosis may be found quite different in a corpse, as might be expected, from observations made during life. No clinical or anatomical researches and experiments have, as yet, fully explained this. The imperfection of clinical researches consists essentially in a defective method of performing the autopsy, while the anatomical examination of a case of enteroptosis not clinically diagnosticated, may lead to an incorrect understanding, or to a total overlooking of certain displacements which have existed during life. The clinical examination is therefore the more valuable.

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Among the organs which can only be recognized fully in the cadaver, the intestine must be placed first. Examination of the patient during life gives us a somewhat correct picture only, of course, of some portions of the colon. One portion of the small intestine can be seen only in the cadaver. On the other hand, we obtain a more correct picture of the form and position of the stomach, and of the position of the right kidney and the uterus, by careful and repeated examinations of living bodies. The stomach in the cadaver appeared more or less shrunken,—in some cases more than would seem possible. The pylorus, especially, expands very much after the reception of food, and again is sometimes reduced to the thickness of the thumb.

The well-known picture of the long, sausage-like stomach may be considered a pathognomonic post-mortem form of enteroptosis. (Figs. 8, *b*, and 24.) Still there are stomachs which remain distended, even after death. A stomach which in life is usually directed downward and to the right, is in death often entirely normal. (Fig. 7, *b*.) The kidney, even if dislocated to a marked extent, slips back after death into its original "nest." From this fact originates the assertion of some anatomists, that a floating kidney is a rare occurrence, contradicting the frequency with which it is found by many physicians, especially by gynecologists. The loosely attached kidney of the anatomists is identical with the movable kidney of the clinical physician.

The same difference of opinion recently existed between anatomists and gynecologists concerning the position and form of the uterus (26). The anatomists considered retroversion of the uterus as the normal position, because it was generally observed in cadavers; but we now know, and anatomists have acknowledged their former mistake, that the uterus of the living woman lies normally in anteversion, and bends backward only after death, if not held back by lesions.

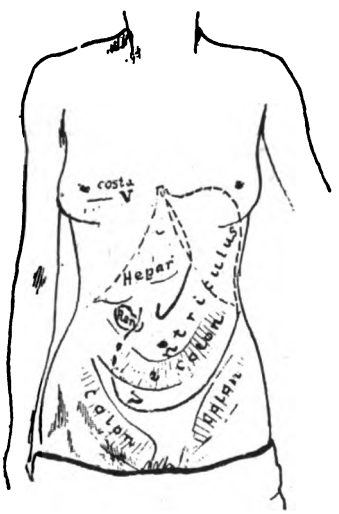

Fig. 7 *a*.
(Intra vitam.)

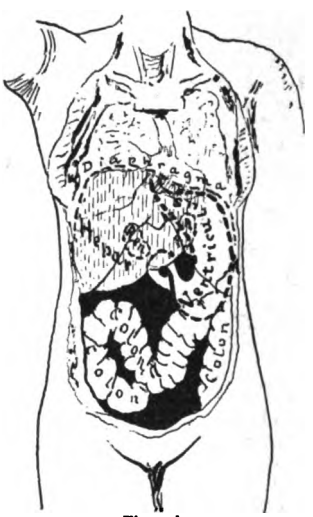

Fig. 7 *b*.
(Post mortem.)

STOMACH AND COLON DISTENDED.

In the post-mortem diagnosis of enteroptosis, the determination of the position of the stomach must be made very carefully, and still more carefully that of the kidneys, while the finding of the uterus in a retroverted or retroflexed condition furnishes no information concerning its position during life. The comparative condition in which the cadaver was found in Figs. 7, *a*, and 7, *b*, I call special attention to, because it seems to express best the existing type found in more than one hundred of my post-mortem cases. I add two other similar discoveries made in dissection as proofs, relating to the possible causes of these marked differences.

In Fig. 7, *b*, the stomach is found completely vertical, and is shrunken in all its diameters. This fact shows, at the

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same time, that the stomach does not hang so low down in death as in life, because the cardiac orifice remains at its normal point, as in all cases of gastrites. The stomach has not only a much smaller volume than is shown in Fig. 7, *a*, but, as I may add,—having had, more than once, an opportunity to observe this relation while making a laparotomy for operating purposes,—at the same time a smaller volume than the normal empty stomach.

Fig. 8, *a*, shows the position of the gastric organs, as found on the 18th of May, 1892, in a man 42 years old. The patient was suffering from mitral insuffi-

man 69 years of age whom I examined July 8, 1892, and found suffering from emphysema and cardialgia. Ascites developed more recently, and on Oct. 2, 1892, five liters of fluid were withdrawn by aspiration. The patient died Nov. 10, 1892, and Fig. 9, *b* and *c*, present the interesting facts found after death. The case was one of carcinosis of the peritoneum produced from cancerous tumors growing on the posterior walls of the stomach. In this case it was noticeable that the transverse colon, formerly lying in the hypogastrium, was, by the ascites, elevated to the upper part of the abdominal cavity, and becoming ad-

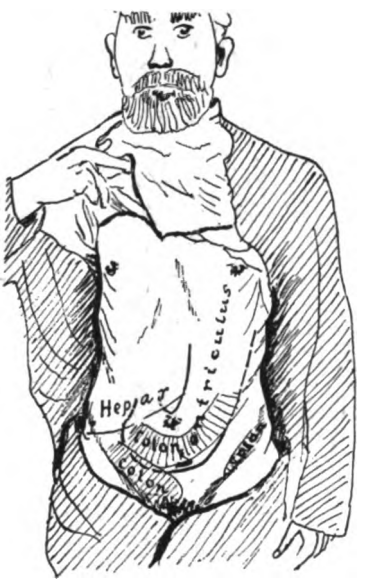

Fig 8 *a*.
(Intra vitam.)

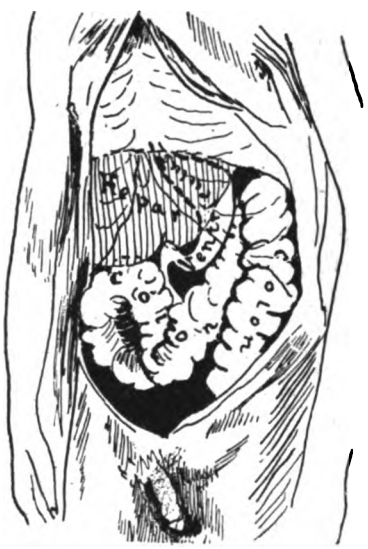

Fig. 8 *b*.
(Post mortem.)

STOMACH AND COLON DISTENDED.

ciency and passive congestion of the liver. He afterward became melancholy, and after wandering about for some days without taking food, died in consequence of a heat stroke. The autopsy showed the liver, which four months before had been enlarged to the navel, to be of normal size, and the right flexure of the colon, which had formerly been pressed down, in its normal position. The most striking changes are those which appear after death, and perhaps even during the last days of life, in case of stomachs which, when distended in life, reach nearly to the symphysis.

Fig 9, *a*, represents the condition of a

herent, did not sink down again after the fluid was removed. More marked still was the elevation of the stomach (Fig. 9, *b*). The force of the upward pressure was so great as to produce a retroflexion of that portion of the stomach which impinged against the diaphragm.

The observations which I have made concerning Glenard's views relating to the prolapse of the abdominal viscera in over five hundred living persons, and more than one hundred post-mortem examinations, may be summarized as follows:—

Displacement of the abdominal viscera, a point to which I shall again revert, is

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very frequent in women, and less frequent in men.

Every organ below the diaphragm, and even the diaphragm itself, may be involved. The part most frequently involved is the colon, next the stomach, then the kidneys, and last the uterus. The liver is very seldom prolapsed, and the spleen still less frequently. In relation to the small intestine, I can give no particular facts. The colon alone may be prolapsed; this occurs quite frequently. The same is true of the kidney, though seldom; also of the uterus, and most likely also of the spleen. The prolapse exists in all degrees, and there

of the cases, this portion of the intestine maintains its normal position. The left flexure of the colon, which can be examined only in cadavers, showed depression in only thirteen of my dissections. (Figs. 19, 21, and 29.) Still less can I conceive that, as Glenard believes he has discovered, the transverse colon decreases constantly from right below to left above, as in Fig. 15. In 38 per cent of the cases dissected by me, this portion of the colon had the form of a more or less depressed loop, but in the other 62 per cent, the cases do not correspond at all to Glenard's type. In 60 per cent of my observations upon living pers ons, I could

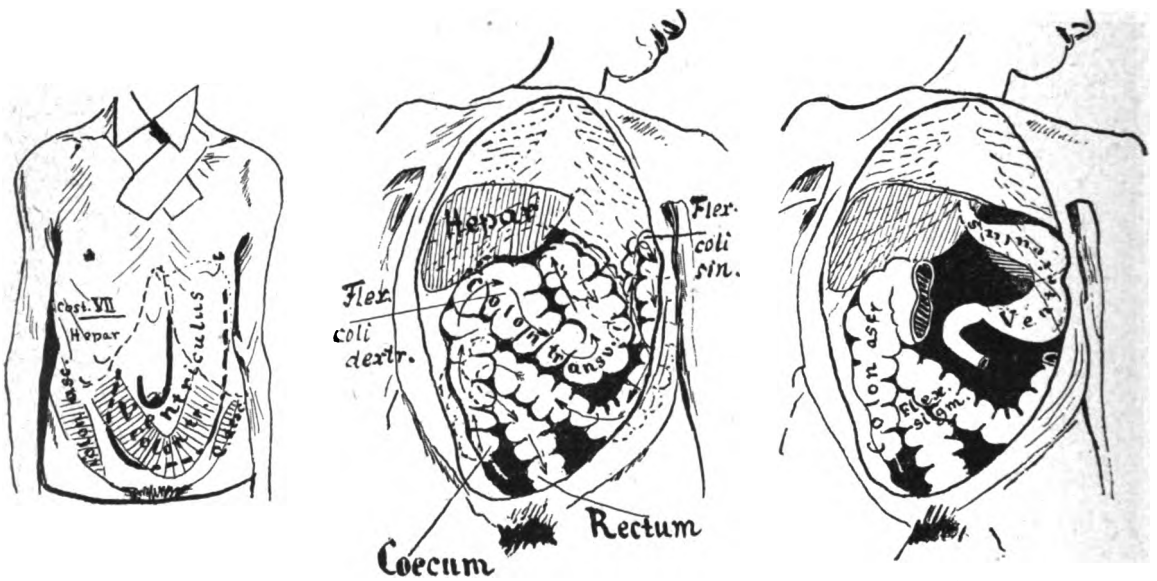

Fig. 9 *a*. (Intra vitam.) Fig. 9 *b*. (Post mortem.) Fig. 9 *c*. (Post mortem.)

STOMACH AND COLON DISTENDED.

is no positive boundary between the normal and the abnormal. In case a single abdominal organ is found prolapsed, we are able to establish the displacement in most cases. These cases may be unhesitatingly pronounced pathological. To this class belong especially cases in which gastroptosis and coloptosis occur coincidentally. This is not to be doubted, because these cases are generally found in full-grown persons, and always in a marked degree, but very seldom in the early stages of development. Glenard's theory concerning the depression, without exception, of the right flexure of the colon, we beg leave to correct, as we have found that in only about two thirds

determine with certainty the depression of the pylorus (the liver we are sometimes unable to recognize), but I was convinced that in cadavers the pylorus is dislocated in 93 per cent of the cases. This dislocation may extend as low as the promontory, and even lower. (Fig. 23.)

The question how frequently gastrectasis may be found in connection with enteroptosis, cannot be answered in numbers, because neither the volume of the stomach nor the boundary between normal and enlarged volume can be actually determined; but in case two or three liters of carbolic acid gas can be developed suddenly in the stomach without creating pain, we may take it for granted

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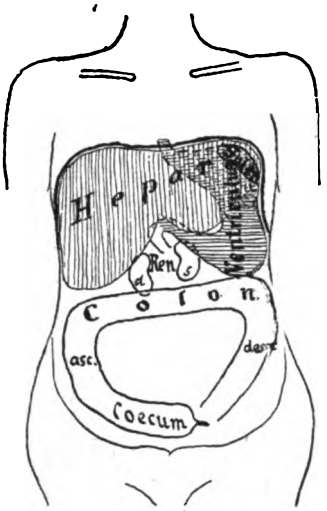

Fig. 14

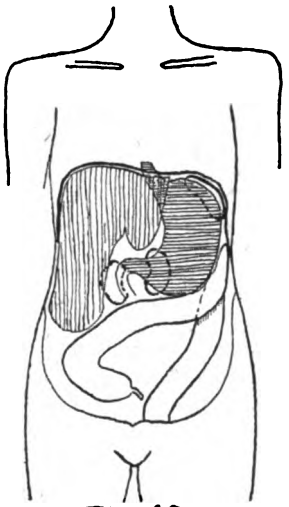

Fig. 15.

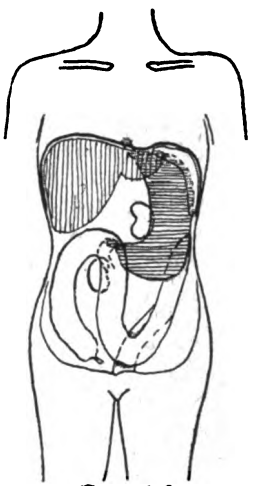

Fig. 16

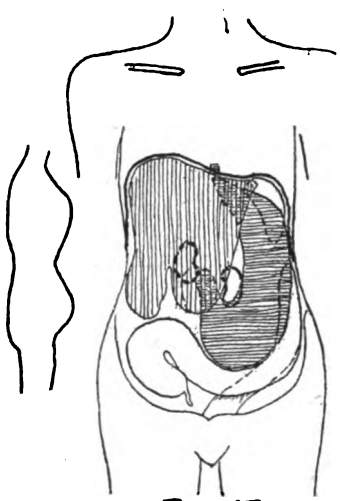

Fig. 17

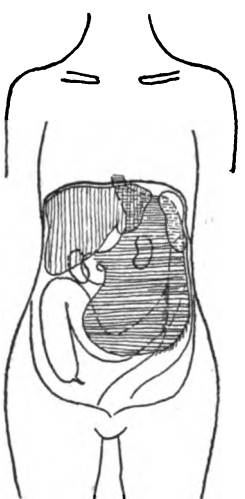

Fig. 18

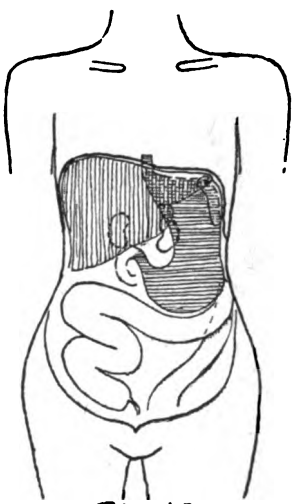

Fig. 19

POST-MORTEM CASES OF ENTEROPTOSIS FROM THE CITY HOSPITAL, DRESDEN, GERMANY.

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that considerable dilatation exists. This is true of patients thirty years old and upward. On the other hand, it is a fact that we quite frequently find in young persons fully developed gastroptosis without simultaneous dilatation. At all events, we must consider the change of position as primary, and the increase in volume as secondary.

In 24 per cent of my post-mortem cases, I have found the form of the stomach somewhat resembling that of an hour-glass (Figs. 14 and 21), having observed that shape distinctly in four or five instances. (Fig. 22.) We can demonstrate this in living persons only very rarely (Fig 13), because the constricted portion is mostly covered by the ribs.

Abnormal spiral forms of the colon are, of course, dependent upon a prolongation of this section of the intestine. The smallest degree of this abnormality consists in a slight curvature of the transverse colon downward, and can be demonstrated only during life, because it is obliterated by a post-mortem shrinking, but may be observed especially in young persons, and in the first degree of enteroptosis; the more advanced and often odd forms belong to advanced years.

Most frequently (in 38 per cent of my post-mortem cases), the transverse colon was prolonged and twisted. The descending colon was seldom thus affected (in 13 per cent, Fig. 20), and the ascending colon very seldom (3 per cent, Fig. 19). The sigmoid flexure was often found affected in the same way, but my photograms of this deformity are deficient.

I found the right kidney dislocated downward in 31 (4 per cent) of my cases of enteroptosis. On the other hand, I was able to demonstrate dislocation or mobility of the right kidney in 51 out of one hundred cadavers. The right kidney was affected in living persons in only 2 per cent of the cases, and in cadavers in 38 per cent.

Descensus (respiratory mobility) of both kidneys I have determined in life in 8 per cent, and after death in 35 per cent of the cases; the left kidney was prolapsed in only 24 per cent of the clinical cases, and in 2 per cent of the post-mortem cases. These statements have reference to 305 patients, and to 100 cadavers with enteroptosis.

The considerable variation between the results of the clinical and the anatomical diagnosis, expresses the difficulties which oppose our efforts at diagnosis, especially in the case of the liver and kidney, which in some cases cannot be overcome, but which, on the other hand, is often a matter of personal skill.

Dr. Schottin, one of my former tutors, quite frequently found floating kidneys, which I, in spite of repeated examination, had not been able to find, and in the joint examination, under anæsthesia, he was usually in the right.

I have never observed prolapse of the spleen. Prolapsed and replaceable liver, I have observed twice in women with pendulous belly, one post-mortem (25) and one during life; but I do not classify the case of the pendulous belly during life with enteroptosis,—and I shall give my reasons for this when I come to the etiological part of my subject. An abnormal position of the uterus occurs often as a congenital condition, or in consequence of the disease of this organ or its adnexes, which I believe is frequently a feature of enteroptosis.

Among 161 of my clinical cases in which I have had an opportunity to determine the position of the uterus, I counted 70 (43.4 per cent) retroversions or retroflexions, and 37 (33 per cent) cases of pathological anteflexion. In all other cases I found the uterus bent neither upward nor forward, but its body inclined toward the right. I am of the opinion that these anomalies of position are, in most cases, the result of the prolapse of the gastric organs which overlie them, a condition to which Glenard has called attention.

Finally, the position of the diaphragm in enteroptosis is subject to greater variation in persons in whom the abdominal organs are in normal position. In most cases of variation, it is either too high or too low.

But the displacements which I have found, somewhat exceed the average in number and in degree, as they have been determined by others from the observations made upon the larger number of cadavers. This difference may be explained by the fact that the post-mortem investigations which I made were, in most cases, on cadavers with depressed thorax.

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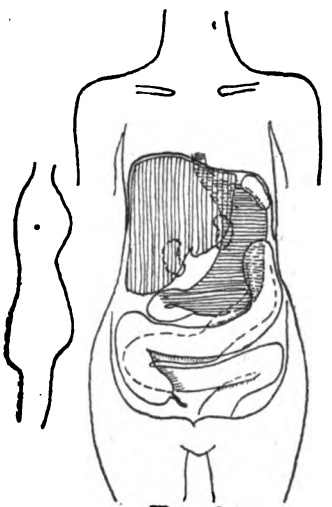

Fig. 20

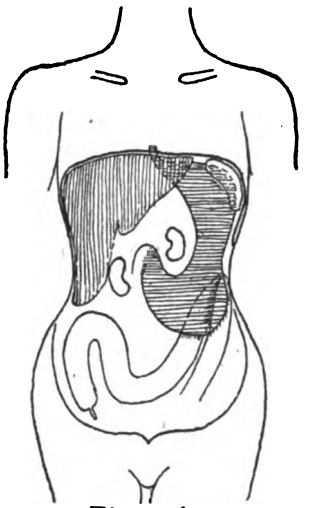

Fig. 21

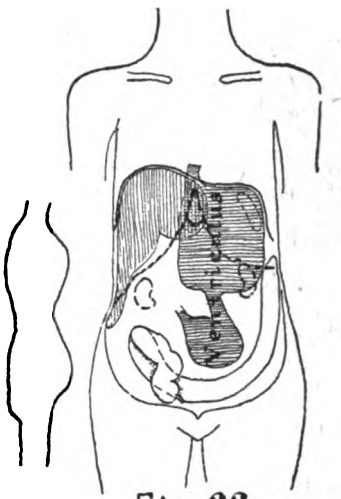

Fig. 22

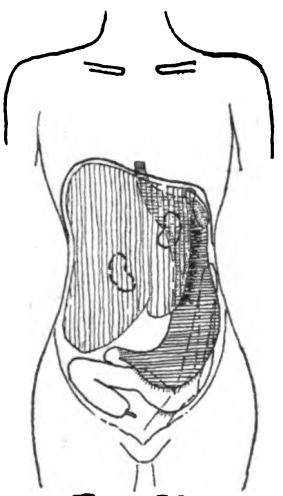

Fig. 23

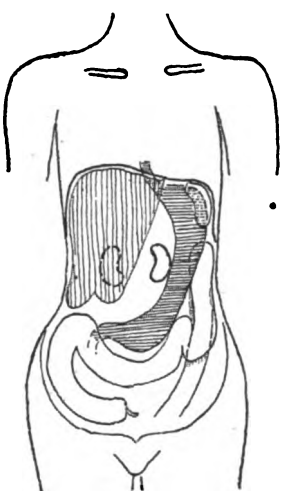

Fig. 24

Fig. 25

POST-MORTEM CASE OF ENTEROPTOSIS FROM THE CITY HOSPITAL, DRESDEN.

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THE NON-SURGICAL TREATMENT OF OVARIAN DISEASES.

BY J. H. KELLOGG, M. D.,
Battle Creek, Mich.

CASE 12.

MISS B., aged 25, entered the Sanitarium as a patient in July, 1891. The patient had been more or less an invalid ever since her twelfth year; had suffered from pelvic inflammation at various times, and from the beginning of menstruation at the age of twelve had suffered from severe menstrual pain. Examination showed retrocession of the uterus; ovarian sensitiveness and congestion; prolapsed stomach and bowels; and floating right kidney. By pursuing the same treatment which has previously been outlined, the patient was, at the end of four and a half months, able to leave the Sanitarium in the enjoyment of very good health. The menstrual pain had ceased; ovarian irritation had disappeared; the stomach and bowels were well held in position, and there had been a gain in strength from 1600 pounds to 3000 pounds. The gain in symmetry had been even more remarkable than the gain in physical strength, as is well shown by the physical chart obtained in this case. The radical improvement made in this patient's health has been permanent.

CASE 13.

Miss T., aged 33, entered the Sanitarium as a patient in September, 1892. She had been an invalid for a long time; had suffered greatly from ovarian pain and the usual accompanying symptoms, — general neurasthenia, hyperæsthesia of the spine, and hysteria. The patient was in an extremely wretched and helpless condition. In two months she returned to her home, having been absolutely free from pain for several weeks, and with an entire relief of local symptoms.

CASE 14.

Miss ——, aged 43, was received at the Sanitarium as a patient in July, 1893. She had been an invalid since her sixteenth year; had suffered from menstrual pain and leucorrhœal disease, right kidney palpably sensitive; stomach prolapsed; uterus in retrocession; right ovary prolapsed and tender; left ovary prolapsed and very sensitive, and more than double the normal size. The slightest attempt to replace uterus and ovaries gave extreme pain. At the end of six weeks, the patient had gained several hundred pounds in strength. The pelvic pains had disappeared. The digestion, which had formerly been very much disturbed, was greatly improved, and the patient had begun to enjoy good health.

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CASE 15.

Miss M., 32 years of age, became a patient in the Institution July 20, 1893. She had suffered for years from a great variety of nervous disturbances, which were mostly neurasthenic in character. One of the most troublesome symptoms was a severe burning sensation of the spine; a constant ringing sound in the head, and great distress at the base of the brain were also prominent symptoms. She had suffered also from very severe dysmenorrhœa. On examination, I found prolapsed stomach, extreme sensitiveness of the left lumbar ganglia of the sympathetic; right kidney movable; left ovary large, prolapsed, and tender. Examination of stomach fluid showed that the patient was suffering from hyperpepsia with fermentation. The plan of treatment was essentially the same as that already outlined, and the establishment of a proper dietary resulted, in the course of a few months, in the restoration of this patient to good health.

CASE 16.

Miss S., 23 years of age, entered the Sanitarium as a patient May 24, 1892. The patient had been ill for a long time, had sought relief from many physicians, but had received no permanent benefit. Examination showed the uterus prolapsed, both ovaries extremely sensitive, vaginal and cervical catarrh, and an erosion of the cervix. Examination of stomach fluid showed hyperpepsia. By the employment of proper physical training, chronic treatment, suitable local measures, and a carefully adapted dietetic regimen, this patient made rapid improvement, and went home at the end of a few weeks, practically well.

(To be continued.)

Sick Room Disinfection.— Much has been written upon this subject and many experiments have been made for the purpose of determining the best and most efficient method of disinfecting the walls of a room which has contained a person suffering from some infectious malady. MM. Chamberland and Fernbach, connected with the hygienic department of the Pasteur Institute, Paris, have recently undertaken a new study of this important question, and have determined two important facts: 1. That disease germs are much less readily acted upon in a dry than in a moist state; and 2. That the activity of the disinfectant is increased from forty to fifty per cent by the addition of heat. They consequently contend that in the disinfection of a room the walls should be moistened by a spray of hot water. The same end, of course, might be accomplished by filling the room with steam. This should be done one hour before the application of the disinfectant. The experiments made by these investigators show that the commercial chloride of lime and peroxide of hydrogen are the most thorough and active disinfectants. It is found that a 1–1000 solution of corrosive sublimate added to the chloride of lime is the most active of the substances named. The following is the method by which it should be employed: Dissolve one part of commercial chlorate of lime in ten parts of water, allowing the liquid to stand for an hour; then filter and decant, and dilute the greenish yellow liquid thus obtained with ten times its volume of water. The investigations showed that this dilute solution, for some unknown reason, is more active as a disinfectant than a strong solution.

In disinfecting a room, the walls should be thoroughly washed with this solution, which should also be applied to the floor after a thorough scrubbing. This disinfectant may also be applied to garments without injury to the fabric, although it will bleach vegetable colors.

Exclusion from Light in Smallpox. — Several years ago, attention was called by Gallivardin to the fact that suppuration and consequent pitting did not occur in smallpox if solar light is absolutely excluded. This method of treating smallpox was first suggested by John of Gaddesden. Gallivardin has recently reported in the Lyon *Medical* the results of his experience with this method for the last seventeen years, and asserts that if the light is perfectly excluded and the treatment faithfully carried out, there is no suppuration, and hence no pitting.

Enlargement of the Pituitary Gland and Acromegalia.— Dr. Dana, of New York, has recently called attention to the enlargement of the pituitary gland as a morbid condition associated with acromegalia and gigantism.

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TRANSLATIONS AND ABSTRACTS

[The articles in this department are prepared expressly for this journal.]

BACTERIA IN WOMAN'S MILK.

BY DR. FRANZ HAUIGMANN,
Breslau.

[Translated for MODERN MEDICINE from *Zietschrift für Hygiene und Infectionskrankheiten*.]

VERY few observations have been made concerning bacteria in woman's milk. Escherich was the first to make thorough researches in relation to this subject. He examined the milk of twenty-five healthy lying-in women, and an equal number of lying-in women in whom there was an elevation of temperature. After disinfection of the nipple with corrosive sublimate and alcohol, a portion of the expressed milk was drawn into a small glass tube by capillary attraction, and the tube was then closed with sealing-wax. This preparation was kept from three days to several weeks at a temperature of 37° C. (98.6° F.) The capillary tube was broken with hot pincers, and a portion of the milk was used for inoculation of gelatin and agar by means of a platinum needle; the rest of the milk was examined microscopically, its reaction being also tested.

In the milk of twenty-five healthy women, the period of lactation varying from the first day to the eighth month, no bacteria were found, either by means of the microscope or by cultures.

The condition of cases in which there was a rise of temperature was quite different. The milk was found to be free from germs in cases in which the rise of temperature was due to affections of a non-puerperal character, such as phthisis pulmonalis, otitis media, etc.; but, on the other hand, there was found, in four out of five cases of excoriation of the nipple with inflammatory appearances about the nipple, a white gelatin—liquefying coccus growing in clusters.

In eleven out of thirteen cases with general septic infection, the milk was found to contain bacteria, and in four of these eleven cases, the yellow as well as the white staphylococcus was found. Escherich supposed that the staphylococci which find their entrance through lesions of the genital apparatus, reach the milk through the blood, relying upon the non-appearance of microbes in the absence of puerperal febrile processes.

Bumm obtained quite different results in the bacteriological examination of milk in cases of mastitis of puerperal origin. In general, the most bacteria are found in milk from breasts containing pus cavities, and which were emptied of their contents incompletely and irregularly. Bumm found that the microbes contained in the milk in these cases were the same as those found in the pus from cracked nipples, and that the first drops of milk were always richer in germs than later portions. He also found great fluctuations in the quantities of germs found in repeated examinations of milk from the same gland, as well as that of different glands. The bacteria usually disappeared from the milk as soon as the cracks were healed and the function of nursing again practiced.

In eight of the cases examined, Bumm found the staphylococcus cereus albus three times, staphylococcus pyogenes albus four times, and pyogenes aureus twice. In four cases the milk was found free from germs.

Bumm also examined, in nine cases, milk from healthy lying-in women whose nipples were quite normal, but who had either never nursed a child or had discontinued nursing. In three cases he found the secretion free from germs. In four cases the staphylococcus cereus albus was observed, and in two cases, the staphylococcus pyogenes albus.

In one case Bumm found the milk, at the first examination, entirely free from germs. At a later examination, however, milk from the same gland contained bacteria, and shortly afterward, a mastitis developed. Bumm concludes, from his examinations, that microbes are introduced from the outside through the milk canals, and play an important part in the origin of puerperal mastitis with pus.

Mrs. Merrit also found staphylococci in milk from healthy glands. She examined fifteen lying-in women with cracks on the nipple, and found staphylococcus albus and cereus in the milk in thirteen cases. She also found in the milk of fifteen lying-in women with quite healthy nipples, the staphylococcus pyogenes albus, and the cereus in three cases. The quantities examined by her,

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as well as by other observers, were always very small,—only one or two drops, which were collected by Pasteur pipettes and spread on gelatin with a platinum needle.

Karlinski has published the case of a lying-in woman suffering from fever due to facial erysipelas with pus formation. The child nursed by her died after ten days. The dissection showed typical septicæmia with parotitis, pleuritis, peritonitis, gastro-intestinal catarrh, and lobular pneumonia. The staphylococcus pyogenes albus, cereus, and flavus were found in the milk in this case, and the same bacteria were found in the blood and intestines of the child.

On the basis of these observations, Karlinski began experiments with pregnant rabbits, as the result of which he arrived at the conclusion that the transition of pus-producing microbes from the blood into the milk-channels is possible, and may be brought about in a short time. Micro-organisms introduced into the uterus while in a state of involution, could be demonstrated in the milk. Of animals suckled with milk infected by staphylococci, a large percentage died of pyosepticæmia. No pus colonies were found in the mammary glands of the infected animals.

Von Eiselberg examined the milk of a woman who had been ill for four months with a febrile disorder. The breasts were perfectly normal. The milk showed staphylococcus pyogenes aureus and albus. The origin of the microbes in this case was believed to be an inflammation of the right mammary gland four days after confinement. The milk of the left mamma, which was healthy, was also proved to contain staphylococcus pyogenes aureus, the origin of which might have been the pus from the right mamma.

The experiments of Cohn and Neumann gave results essentially different from those of any previous observers. In fourteen examinations of the milk of women with healthy breasts they found the milk to be sterile in only six cases, and of these, only a small quantity was examined. In all cases where a larger quantity of milk (as much as five drops) was examined, the results were always positive. After having disinfected the nipple with corrosive sublimate, alcohol, and ether, the milk obtained by pressure was placed in reagent glasses, in different portions, and examined by means of plate-cultures.

In forty-eight positive cases they found pus cocci forty-three times. Besides the pus-cocci, other species of bacteria were found in nine cases.

Cohn and Neumann summarize their results as follows: The milk from the healthy breast of a woman usually contains pus-cocci, especially the staphylococci, which exist in varying abundance, and often exclusively in the milk. These germs have often entered from the outside, and are therefore most numerous in the peripheral portions of the gland canal. Their presence therefore cannot be used as diagnostic of internal maladies. It cannot be proved that these germs decompose the milk, or that they commonly injure the suckling.

In the face of differences of opinion, it seemed important to repeat or review the researches recorded by means of a greater number of observations. It seemed, most of all, essential to examine the mammary secretion of healthy lying-in women with normal breasts. It seemed to be clear, also, that the value of Escherich's discovery must be essentially modified, if the results of experiments made by Cohn and Neumann find full support, as they do, in the experiments of Bumm and Mrs. Merrit. We must not only deny the diagnostic importance of bacteria in the milk in cases of febrile puerperal disease, but also the supposition that cocci always reach the milk by way of the blood.

It is also important to determine whether the milk contains pathological elements which may have reference to the origin of puerperal mastitis in cases in which the epithelial covering of the nipple is indicated.

Special Researches Relating to Germs Present in Woman's Milk.— The milk of sixty-four lying-in women was examined bacteriologically, also a case of "witch milk" on a five weeks' suckling. The mamma was first cleansed with water, soap, ether, and sublimate. Then the sublimate was removed by pouring alcohol over the parts, and this again was washed away by means of sterilized water. The milk was obtained from the glands by a gentle pressure, and received into sterile test-tubes. At first the secretion entered the reagent glass in one or more spurts. Whenever milk was found

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in the nipple, the sample was taken in two portions and measured as accurately as possible.

While in the first attempts small samples consisting of two, three, six, ten, and twenty drops were examined, it appeared to be more advantageous to avoid, by the use of as ample a sample as possible, the danger of infection, in using the entire portion obtained for examination when tested. The plates were preserved from thirty-six to forty-eight hours in an incubating oven at a temperature of about 35° C. (95° F.) The quantities examined fluctuated between .2 and 3.2 c.cm., but in the majority of cases the quantity examined was at least .5 of a cubic centimeter.

Seventy-six examinations were made of the milk obtained from 73 different breasts. Absolute sterility of milk was found in only four cases. The first of these was that of a lying-in woman who was brought into the Royal Woman's Hospital in a febrile condition, and showed, at the time the milk was taken, a temperature of 40° C. (104° F.) The breasts contained very little secretion. Two cultures were made; both remained sterile. In the second case, the subject, who was a healthy lying-in woman, was three days *post partem*. The quantity of milk was so small that direct inoculation became necessary. The four or five drops obtained for a sample proved to be absolutely germless. The third case was a notable one, from the fact that the milk obtained from the left mamma contained germs, while that from the other was sterile. The woman had been nursing her child for fifteen months, and the milk, notwithstanding the advanced period of lactation, was extraordinarily abundant. The quantity of milk obtained from the right breast was very large,— 10 c. cm. in all. The portion examined was 2.5 c. cm. No milk had been removed before the portion was examined, and the child had not been put to the breast for six hours previous.

The result obtained from the last of my negative cases was similar. The milk from the left mamma of the lying-in woman was sterile, while that from the right contained germs. In all the other cases, usually after eighteen hours, there were found different numbers of colonies, some whitish, some orange-yellow, and some glossy.

Origin of Germs found in Woman's Milk.— Escherich, as has already been mentioned, held the opinion that the microbes reached the milk through the blood. The principal support of this view was found in the theory which he defended by the results of his experiments, that the milk of puerperal lying-in women always contained staphylococci; while the milk of healthy lying-in women with sound breasts is always free from germs. Since the fact has been established by the results of Bumm, Merrit, Cohn, and Neumann, and the work above mentioned, that the milk of healthy lying-in women with normal breasts may contain staphylococci in a large number of cases, the question naturally arises whether the micro-organisms found in the milk of feverish lying-in women may not reach the milk in the same way as under normal conditions. We have no ground for the affirmation that bacteria reach the mammary glands of healthy women through the blood. On the contrary, everything points to the idea that germs wander from the skin, where they are always found in great abundance, through the apertures of the milk-ducts found in the nipple.

This view is especially supported by the researches of Bumm, who first advanced it, and also by many cases in which suppurating cracks of the nipple were found, and in which the existence of bacteria was proven in the pus of the crevices. In the same manner may the bacteria constantly found upon the skin reach the milk-ducts of the mamma.

Why, of all the species of microbes which inhabit the human skin, the staphylococci especially, and generally the staphylococci pyogenes albus, should be the ones to penetrate the milk canals, is a question to which, at this time, no satisfactory answer can be given. On the other hand, we will not deny that under pathological conditions the transition of bacteria from the blood to the milk, especially of staphylococci, may take place.

Experiments with animals in which results at least partly favorable, have been obtained by the injection of bacteria into the blood, are not wholly analogous, as in cases of natural infection. The conditions are essentially different from a case in which there is simply an excess of bacteria in the blood.

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EXPERIMENTAL HYDROTHERAPY IN RUSSIA.

DR. H. STOROSCHEFF, of Moscow, has made some experiments for the purpose of showing the physical effect of tub-baths of one fourth to one half hour's duration, at a temperature of 34° to 35° C. (93° to 95° F.)

In order to give a good idea of the development of Russian literature relating to hydrotherapy, it is best to explain in a general sketch, the results of Russian researches concerning the physiological effects of the so-called tub-bath. In consequence of the changed thermic conditions in the tub-bath; namely, the cessation of heat radiation and perspiration in those parts of the body which are immersed in water, it would seem that the temperature of the body after the bath must be higher than before, and this was demonstrated to be the case by the researches of Dr. Jakimoff, who made measurements of temperature at three different places, in the external auditory canal, in the axilla, and in the rectum. In most cases the temperature was found to be higher immediately after the bath than before. The increase in temperature fluctuated, in the observations made at the ear, between .5° and 1.6° F.; at the axilla, between .2° and 1.6° F. The temperature was found to have fallen, by observations made at the rectum and the ear, only once in twenty cases, .5° F. at the ear and 2° F. at the rectum. At the axilla the temperature was found lower in three cases, the maximum loss being .7° F.

The after effect, in cases of bed-ridden subjects, has been observed to be most striking at the external auditory canal, where the temperature, two hours after the bath, was usually found to have fallen .2° F. No regular change in the temperature was discovered in the observations made at the axilla after the bath, while the rectal temperature was found to be increased in one half the cases.

Comparative researches have established the fact that the temperature exercises an influence upon the modification of the body temperature. The results of the bath have been further studied in the researches of Goralewitsch, who observed upon the upper part of the thigh, the changes in skin temperature resulting from the bath. The average of ten observations showed the increase of temperature to be 1.3° F. The maximum was 3.2° F. The skin temperature increased somewhat, one half hour after the bath.

Further researches have shown that the body temperature does not always increase, even after a bath of a half hour's duration. After a bath of shorter duration, such an influence is seldom observed. On the contrary, the temperature not infrequently falls, under such conditions. Thus, for example, the temperature of the rectum after baths of one half hour's duration, increased only once in five cases, the amount of increase being .7° F. In the other four cases there was a decrease of from .2° to .4° F. In one case the axillary temperature did not change at all, and in four cases decreased from .2° to .5° F.

Of the sixteen cases examined by Orloff, the temperature of the rectum, after baths of 10 or 15 minutes' duration, was higher in four cases, and in five cases lower than before the bath. In seven cases the temperature did not change at all.

In ten cases observed by Goralewitsch, the temperature in the mouth and in the axilla, was in all cases lower (from .7° to .9° F.) immediately after a bath of 10 minutes' duration.

The after effect in the cases of Zawadski and Goralewitsch was only perceptible one half hour after the bath, and consisted usually in a diminution of temperature. Zawadski found in the temperature of the axilla, an increase of .1° to .2° F., and in another case, .4° F., while in the rectum the increase was from .2° to .5° F.

The cases of Ratschinski differ from others in the fact that the decrease of body temperature after baths of 15 minutes' duration, continued for a whole hour after the bath.

The increase of the pulse in baths of 95° F., has been frequently observed. In some of the cases of Jakimoff, the difference amounted to six beats per minute.

Orloff, on the contrary, has observed the increased pulse-rate only twice in eighteen cases, while in sixteen cases a decrease, with a maximum of eighteen beats, was observed.

Goralewitsch noted a slowing of the pulse (about four beats) in some cases, and Ratschinski observed a somewhat larger decrease (from 8 to 12 beats).

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According to my sphygmographic observations, the pulse rises after the bath, and is more nearly vertical. Goralewitsch has, on the contrary, seen no difference before and after the bath.

According to Jakimoff and Mrongowius, the blood-pressure decreases immediately after the bath, but not very much; about 4.5 to 9.3 m. m.

Babaew-Babajan has observed, in all these cases, one fourth hour after the bath, an increase of blood-pressure of about 8 m. m. In three of these cases the blood pressure continued to increase for three fourths of an hour, while in two other cases it had decreased.

Milaewski, on the contrary, has only once observed a slight increase of blood-pressure one fourth hour after the bath, while in four other cases the blood-pressure was lower than at the beginning of the experiment. The normal pressure was not reached until after one half hour, but at the end of an hour was usually exceeded, except in one case, when the blood-pressure remained low.

Draispul noted a new fact; namely, that the effect upon the blood-pressure of a tub-bath of 25 to 30 minutes' duration is dependent upon the time of day. In 11 cases out of 12, the blood-pressure five minutes after the evening baths, had decreased 6 millimeters. It usually increased, on the contrary, after the morning baths, reaching a maximum of .5 m. m., decreasing in only three cases. These changes had mostly disappeared at the end of half an hour.

The cause of the difference between the effects of the morning and evening baths, Draispul explains by the circumstance that children, upon whom most of the measurements of blood-pressure were made, soon fall asleep after the evening baths. Observations have been made upon them when they were only half awake, and it is well known that sleep produces a decrease of blood-pressure.

According to the experiments and observations of Milaewski, the tub-bath produces no such regular fluctuations of the blood-pressure in aged persons as in the cases of younger persons and children. The blood-pressure usually falls immediately after the bath, but in 5 cases out of 30 it was higher than the normal.

It is a well-known fact that in healthy young persons, the blood-pressure, although decreased immediately after the bath, soon again reaches the standard of health. In old persons, on the contrary, the decrease of blood-pressure continues, reaching its maximum at the end of half an hour.

According to Jakimoff, the breathing is usually quickened, but not always. According to Goralewitsch, the rate of respiration is unchanged.

In one half of Orloff's cases, no change was observed in the respiration for 10 minutes after the bath, while in the other half of the cases, the rate of respiration was decreased, except in two cases, in which there was a slight quickening.

According to the dynamometrical researches of Jakimoff, the power of pressure with the hands is diminished about one kilogram.

Mrongowius observed later an insignificant decrease in the muscular power, with the exception of the two muscle groups, the flexors of the knee and the flexors of the trunk and hip joints, where an increase took place.

The decrease of muscular strength lasted, in the case of Mrongowius, through the evening, since, at the dynamometrical experiments in the evenings of the bath-days, there was observed no increase of muscular strength in comparison with the morning's determinations, while according to other observations, this should be expected.

Zawadski observed in his five cases, a decrease in the muscular strength of the hands (5.3 kilograms according to Collin), and three quarters of an hour later an increase of the same above normal. The cause of the lessening of the muscular strength after baths is most likely connected with the decrease of electro-muscular irritability, which has been proved by Ischewski of hydro-faradic baths.

The irritability of the skin increases, according to Goralewitsch and Ratschinski, 1 to 2 c. m., in most cases.

The temperature falls through radiation during the first fifteen to twenty minutes after the bath, increasing again later to the normal, and even higher.

Skin perspiration increases after the bath, especially during the first half hour, in consequence of a congestion of the skin. This increase of skin-perspiration after the bath depends upon the temperature of the bath, and the maximum is related to the maximum changes in the body temperature and in the pulse.

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In the case of children, according to Draispul, skin perspiration, and probably also the thirst, are modified by the bath. Twelve out of sixteen children drank less during the period of bathing.

The effect of tub-baths upon skin and lung exhalation, as in the cases of Zawadski, show no regularity. In three out of five cases the secretions increased, and in two other cases they decreased. Parallel with this was the quantity of urine, which in the first three cases was found to be larger, and in the last two cases smaller.

The assimilation of the element of nitrogen in the blood, and the consumption of nitrogen was increased (1.58 respectively, 2 to 5 per cent). From three of these cases the result obtained was, that the increase of nitrogen consumption continued five days after the baths.

Sigrist, in his two cases, observed no influence of the baths upon nitrogen assimilation, because the fluctuations were the same, and did not surpass 1 per cent.

The assimilation of the fat of the blood was increased by baths of one half hour's duration taken some days apart, in Krawkoff's cases, .34 per cent during the bath-period, and .84 per cent after the same, with a progressive increase of the weight at the same time.

Purifying Water.— Dr. Daremberg, writing in *Medecine Moderne* concerning the means of rendering cholera-infected water innocuous, says that this end may be accomplished in one of three ways; viz., by filtering, by boiling, or by the addition of some chemical substance which will destroy the germs of disease. The first of these methods is, as a rule, ineffective, and can be relied upon only when every detail is most scrupulously attended to. The second is effective, but inconvenient, and cannot always be carried out, fire and a suitable vessel for boiling being indispensable. The third method is one which, he says, is equally effective with boiling, and has the advantage that it can be carried out anywhere and at any time.

The purification of water has been effected by the addition of alum, but the author prefers the process of acidulation, especially in cases of possible cholera infection. Citric acid may be added to the water in the proportion of 60 to 80 centigrams 2 to 2⅓ ozs. to the liter of water. This method is inexpensive, does not impart any unpleasant odor or taste to the water, and can be employed anywhere, without any cumbersome or delicate apparatus. In place of citric acid, tartaric or hydrochloric acid may be used, if desired.

Hydrotherapy in Gynecology and Obstetrics.— Dr. Edmund Tuszkay, of Buda Pesth, commends hydrotherapy as being the most important of all the natural agencies which may be employed in the treatment of disease. He believes the therapeutic value of water to be based upon its efficiency as a means of regulating temperature, and thus controling nutrition and functional activity, of which he considers temperature the natural index. He considers hydrotherapy of especial value in gynecology and obstetrics. The writer attaches especial value to exciting sitz baths, which he divides according to temperature, into very cold, cold, and lukewarm, the temperatures being respectively, 45° to 59°, 60° to 77°, and 79° and 80° to 88°.

In solidifying pelvic exudates, he obtained excellent results from very cold sitz baths of five to ten minutes' duration, followed by the hot vaginal douche. In cases in which cold baths are contraindicated, equally good results are obtained by a protracted warm sitz bath followed by a very short cold douche, the ice-bag, the cooling-coil, and other refrigerative means in appropriate cases.

Influence of Chloroform Vapor on Hens' Eggs.—Dr. Féré recently reported to the Biological Society of Paris, the observation that the development of the embryos in eggs may be suspended by the exposure of the eggs for two hours or more to the vapor of chloroform or turpentine.

Lavage in Hiccough.— Several cases have recently been reported, in which refractory hiccough has been promptly relieved by lavage of the stomach. The writer has often seen severe pain in the stomach, accompanied by hiccough and other distressing symptoms, relieved by the use of the stomach-tube, washing the stomach with an antiseptic solution consisting of 1 dr. of sulphite of soda to a quart of water.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Treatment of Cancer by Erysipelatous Inoculation.— Dr. W. T. Bull, of the New York Cancer Hospital, and his assistant, Dr. Coley, have recently announced the successful treatment of cancer by inoculation with a pure culture of streptococcus characteristic of erysipelatous inflammation. They were led to undertake experiments with this microbe by the fact that a cancer patient in the hospital who had accidentally been inoculated with virus of erysipelas, improved very rapidly after the inoculation. In the experiments which were made upon other patients, twenty-five per cent of the cases of carcinoma were cured, and forty per cent of the cases of sarcoma. The inoculation was repeated every forty-eight hours, the injection being made into the tumor itself. There is, of course, no small danger in this method of treatment, and it cannot as yet be said to rest upon a scientific basis, but there seems to be some ground for the supposition that the toxine produced by the microbe of erysipelas exerts a curative influence in cases of malignant disease.

Microbes on Postal Cards.— Prof. Uffelmann, of Rostock, has recently made some experiments which show the readiness with which microbes may be transmitted through postal cards, letters, etc. Among other experiments he infected a letter with cholera germs, and threw it into the post bag. Twenty-four hours later the letter was taken out, and the germs were found to be still alive. Among other experiments the germs were found to be alive on postal cards which had been infected twenty hours before. When placed upon coins, the germs died rapidly. A fly infected with cholera germs was placed upon beef, which a short time afterward was found to be swarming with germs. A finger was moistened with liquid containing cholera germs; an hour later, after the finger had dried, it was rubbed on some roast beef, upon which a great quantity of germs were afterward developed.

Bacteria of the Genital Canal.— Stroganoff has made a careful investigation, and has found that the vagina contains microbes at all periods of life. He examined a considerable number of subjects, including young infants. The microbes most commonly met with were bacilli. The vaginal secretion is usually acid. The acidity is due to the presence of acid-producing bacteria. The acid produced by microbes is destructive to the germs by which it is produced. The cervical mucus is acid, and destroys microbes. As the result of this fact, microbes are rarely found in the cervical canal in health. Out of forty-seven subjects examined, no microbes were found in twenty-two, and in the remainder of the cases in which the genital canal was healthy, only a very few germs were found in the cervix. In cases of catarrh of the cervix, and other morbid conditions, microbes of various sorts are abundant.

Typhoid vs. Typhoid.— Fraenkel, Pathologist to the new General Hospital at Hamburg, has recently obtained remarkable results in the treatment of enteric fever by injecting sterilized cultures of the typhoid bacillus. He prepares his injection as follows: Test-tubes containing sterilized thymus broth are inoculated with typhoid bacilli from cultures grown on agar. The tubes are exposed for seventy-two hours to a temperature of 37° C., then heated in a water bath at 60° C., by which means the broth is completely sterilized.

The hypodermic injections of this fluid are made into the gluteal region. The results observed in fifty-seven cases were as follows: After the first injection of half a c. c., no change; after a second injection of one c. c., a rise of temperature, sometimes followed by rigor. On the third day the temperature begins to fall, the decline being still more marked on the fourth day, reaching a point half a degree to a degree lower than at the beginning. If the treatment is now suspended, the temperature soon rises again. After the injection of two c. c., the temperature again falls, after the end of two days, and lower than at first. The treatment is repeated every third day, the dose being increased each time one c. c., until the temperature fails to rise. Un-

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der this treatment the fever assumes a remittent type. There is a profuse perspiration, marked diuresis, and general improvement. The temperature becomes normal, the diarrhœa ceases, and convalescence is established. A pink eruption, however, sometimes appears after the fever has entirely disappeared. The injections produce favorable effects, even when begun late, when the temperature shows a disposition to oscillate within wide limits (amphibolic of Wunderlich). A single injection of one c. c. is sufficient to cause disappearance of the fever. The treatment seems to have no influence on intestinal hemorrhage. Prevention of pneumonia does not prevent relapses.

Prof. Rumpf has obtained similar results with sterilized cultures of the bacillus pyocyaneus used by the same method. Prof. Rumpf's observations indicate that the course of infectious diseases may be modified in a marked and favorable manner by the anti-toxines produced by other organisms than those which are the specific cause of the disease.

Tetanus in Hens.— Drs. Courmont and Doyen, of Lyons, have recently succeeded in inoculating hens with tetanus, employing cultures of Nicolaïer's bacillus. This is the first time hens have been found susceptible to this disease. The experimenters were also successful in vaccinating hens against tetanus by means of small doses of the soluble products of the bacillus.

Tetanus from Inoculation with Nicolaier's Bacillus.— While experimenting upon animals, Dr. Nicolaïer accidentally wounded himself in the left hand with a needle of a syringe which had been used in the inoculation of a hen with a filtered culture. Four days later generalized tetanus appeared. Spasms appeared at first at the point of inoculation, where they persisted long after other parts of the body had returned to their normal state. The incubation period of four days confirms the views of Drs. Courmont and Doyen, who hold that the toxine of tetanus is not in itself toxic, but that after introduction into the system, it gives rise, by a sort of fermentation, to a strychnine-like toxine, to which the characteristic symptoms of tetanus are due.

Tuberculosis Conveyed by Bedbugs.— Dewevre (*Revue de Med.*, No. 4) reports the case of a boy eighteen years old who developed pulmonary tuberculosis after having slept with a brother who had since died of the disease. A third brother, with whom the second had slept, had likewise died of tuberculosis. The patient presented numerous bedbug bites, and it was learned that the bed in which he slept contained a large number of the parasites. Thirty of the bugs were captured, and used to inoculate three guinea-pigs, all of which died of tuberculosis. Cultures of tubercle bacilli were also obtained from bugs taken from healthy surroundings and brought in contact with tuberculous sputum. The bugs evidently become infected directly from human beings, or indirectly through the medium of the expectorations, or by transmission from one animal to another. The transmission of tuberculosis from the bugs to human beings remains an open question. — *Wiener Med. Presse.*

Paper Money as a Carrier of Infection.—The possibility of infection being conveyed to a large number of persons by means of paper money has often been suggested, and an examination of the notes of the Bank of Spain in Cuba, a report of which has recently been published by Drs. Acosta and Rossi in the *Chronica Medico-Ouirurgico de la Habana*, shows that this form of currency is certainly capable of containing septic germs. The notes chosen for their experiment were some that had been in use for quite a length of time, and represented values of only a few pence. It was estimated that two notes, weighing together about fifteen grains, contained more than 19,000 germs of various kinds. Cultures were made in broth, on gelatin, and agar, and injections made into the peritoneal cavity of rats and guinea-pigs, most of which died within 24 hours. Post-mortem examination showed signs of peritonitis and congestion of the liver and kidneys. Blood taken from the heart and from the peritoneal cavity was made use of to inoculate solid media, in which colonies developed so rapidly that it was impossible to determine their precise nature, many different forms being intermingled.

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PREVENTION OF CONSUMPTION.

WE are glad to note the steps which have recently been taken by the State Board of Health in the direction of prevention of consumption. With its characteristic foresight, for which the energetic secretary, H. B. Baker, is chiefly responsible, this board, always in the forefront in sanitary reforms, has undertaken a most commendable missionary work in the education of the people of Michigan with relation to the dangerous communicability of consumption, and the methods by which the extension of this disease may be prevented.

The State Board of Health took some action with reference to scarlet fever and diphtheria, and later in relation to typhoid fever, and with the result that the mortality from these diseases, as shown by the death rate in Michigan, has been reduced about one half, resulting in the saving of thousands of lives. He now proposes to include consumption with "diseases dangerous to public health," and to apply to this disease many of the same regulations which have been established by the action of the Legislature in relation to scarlet fever, diphtheria, smallpox, and other maladies usually recognized as contagious.

In carrying out this plan, the board requires that physicians shall report to the local health officer all cases of consumption which they meet in practice, and the health officer is then required to place in the hands of the patient or family, the literature relating to this subject, which will be furnished by the board, and which will give instruction respecting the contagiousness of the disease, the means by which it is communicated, and the means by which communication may be prevented.

Doubtless thousands of lives may be saved by the knowledge thus communicated, and it is hoped that a similar action may be taken by State Boards of Health throughout the Union. It must not be forgotten, however, that personal hygiene is an important factor in the prevention of this disease. A perfectly healthy man is proof against germs. It is only when the body becomes weakened by abuse, so that its defending powers are lessened, that the germs of tuberculosis and other similar diseases are able to obtain a foothold. J. H. K.

SANITARIUM FOR INDIGENT CONSUMPTIVES.

DR. DETTWEILER, whose institution for the treatment of consumptives at Falkenstein has long been famous, and justly so, has recently organized an establishment for the treatment of consumptives not able to pay the prices necessarily charged in ordinary establishments of this sort, and has succeeded so well that he is able to receive this class of invalids for treatment, for the small sum of 2½ francs (50 cents) per day. This price does not quite cover the actual cost, but by the aid of subscriptions which have been received, is sufficient to maintain the establishment. Poor patients receive precisely the same care and treatment as the wealthy, and thus are given an opportunity for recovery which would otherwise, on account of their limited means, be denied them.

The writer has for a number of years been much interested in the establishment of an institution of this sort in this

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country. Certainly there is great demand for such an establishment. Some steps were taken in this direction several years ago. Since that time measures have been in progress which it is hoped will in the near future result in the materialization of the project. It is as important to cure the poor consumptive as the rich, not only for his own sake, but for the sake of those with whom he may associate, as the uncured victim of tuberculosis may be the means of conveying the disease to scores or even hundreds of other persons. This is a matter which concerns the public health, as well as that of the individual, and one to which our sanitariums might very properly give more attention. J. H. K.

TOBACCO INSANITY.

THE deteriorating influence of tobacco-using upon the young was long ago recognized by the French government, leading to the prohibition of the use of tobacco by the students in the public schools. The Swiss government have taken even stronger ground upon this matter, forbidding the use of tobacco altogether to juniors. A boy found smoking in the streets is now promptly arrested and punished by fine or imprisonment.

Dr. Bremer, late physician to St. Vincent's Institution for the Insane, at St. Louis, has recently called attention to the fact that the use of tobacco by the young is productive of mental and moral deterioration, while in older persons the use of the weed produces brain disease and insanity. He attributes the obscure and unintelligible style of the philosopher Kant to his excessive use of tobacco, and he might with equal justice find in tobacco-using a cause for the notorious irascibility and pessimistic tendencies of the Scotch author Carlyle.

The editor of the *Review of Insanity and Nervous Diseases* announces his belief that many a nervous or idiotic child is the result of the tobacco-using habit of his parents. The baneful effects of tobacco-using are not so immediately noticeable as those of the liquor habit.

In view of the numerous facts pointing out the pernicious character of this drug, and the baneful effects of its habitual use, it is astonishing that physicians are not unanimous in their opposition to it. Still more astonishing is it that there are to be found many physicians who themselves indulge in the use of the weed. Dr. Bremer mentions the case of a physician who rewards his thirteen-year-old son with extra strong cigars whenever he obtains high credit-marks in school. It is astonishing that such a father should have a son capable of getting high credit-marks. The physician, above all other men, should be free from habits which, like tobacco-using, are noisome, repulsive, and degrading. J. H. K.

Corset Wearing.—It is said that corset wearing is gaining ground among the officers of the British and German armies. Fashionable young English swells have been wearing corsets for the last quarter of a century, but it is comparatively recently that the practice has shown a disposition to extend itself to any considerable degree. Women are wearing corsets less, men more; but fortunately the men who are taking to corset wearing belong to a class with whom society could very well dispense, and so we shall not undertake to inaugurate a reform among male corset wearers, but let the good work go on until the shallow-pated creatures who ape this feminine folly are exterminated. J. H. K.

The Use of Tuberculous Flesh as Food.—At the "Congress on Tuberculosis" recently held in France, under the chairmanship of Prof. Verneuil, many interesting facts were brought out relative to the cause of this disease in human beings. Considerable time was given to

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the discussion of the disease as it appears among lower animals, especially sheep and cattle. It was shown that according to recent investigations, tuberculosis is much more frequent among cattle than has formerly been supposed. M. Nocard has discovered that by the employment of Koch's tuberculine the disease can readily be demonstrated in cases in which it could not be discovered by any other means.

But the point to which we wish to call especial attention is the disposition of animals found to be suffering from tuberculosis, or consumption. According to M. Nocard, when a herd of cattle has been examined by means of the tuberculine test, all those animals which are found to be suffering from the disease in an incipient or undeveloped form, are placed by themselves, and are then fattened as rapidly as possible, so that they can soon send them to market to be used as food. The Professor quiets the fears of his readers by assuring them that when this method is pursued, the cattle can be gotten to market and sold advantageously before the disease has reached a point which would attract the attention of the food-inspector. It is hardly necessary to point out the danger involved in the proceeding proposed.

The use of the flesh of tuberculous animals as food has long been known to be one of the most common methods by which the disease is propagated. M. Nocard's ingenious method of detecting the disease is hence likely to increase the spread of the disease among human beings, although it may doubtless prove very profitable for stock-raisers, and enable them to get their diseased animals to market in a condition to avoid discovery by an inspector. J. H. K.

Cancer from the Use of Pork.—MM. Verneuil, of Paris, and Roux, of Lausanne, have recently announced the curious theory that the use of pork is the cause of cancer. M. Verneuil some time ago announced that his observations had convinced him that the abuse of meat as a regular food was the most probable cause of cancer, and the further study of the subject has led him to the conclusion that pork, if not the sole cause of cancer, is at least a very common factor in the etiology of this disease. He had especially noted that Orthodox Jews who adhere closely to the laws of Moses, are rarely if ever subject to cancer. M. Roux confirms these observations of Verneuil.

We are hardly ready to corroborate this theory on a scientific basis, but we rather incline to the opinion that grossness of blood resulting from the use of unhealthful food of any sort, particularly the flesh of diseased animals, might prepare a soil suitable for the development of the parasite to which this dreadful disease is doubtless directly due. Experiments in inoculation with cancer virus have shown that while the disease is easily propagated by inoculation in a person who is already affected by it, new foci being easily established by this means, attempts to transmit disease from a person affected by it to a different person, usually fail. This indicates that in a person already suffering from the disease, there is a prepared condition of the system which affords favorable conditions for the development of the disease.

The human body in perfect health is capable of destroying all invading microbes, but when the germicidal properties of the tissues are impaired by gross habits of living, and especially by a general poisoning of the tissues from the reception into the system of the various toxines and ptomaines contained in animal bodies, this power of defense is lost, to a large extent, and microbes of various sorts, having gained access to the body, easily overcome the weakened phagocytes, against which, in a state of health, they would have been powerless.

J. H. K.

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Hygienic Treatment of Phthisis.— M. Nicaise, in a paper read before the recent "Congress on Tuberculosis," took strong ground in favor of the curability of this disease. He gave first place to hygienic therapeutics, regarding these as the most powerful of all the measures which can be used in combating this malady. He called attention to the experience of physicians in all ages, as confirmatory of this view. The measures recommended by M. Nicaise may be briefly summarized as follows: —

1. Over-feeding, or rather encouraging nutrition by giving the patient as large a quantity of simple, wholesome, and very nutritious food as he can possibly be made to digest.

2. Living in the open air as much as possible; sleeping at night with the windows open.

3. Prolonged rest in a reclined position, until lesions have cicatrized; then graduated exercise.

4. A suitable climate.

Experience has shown that a dry, cool, and moderately elevated climate is most favorable to recovery from this disease.

J. H. K.

REVIEWS.

Metallic Interstitial Electrolysis. — By Augustin H. Goelet, M. D. P. Blakiston, Son & Co., Philadelphia.

Metallic electrolysis which was first noticed by Prochownick, consists in the application of the electrical current to the uterine cavity or other surfaces, by means of a copper, zinc, iron, or silver electrode, the purpose being to apply to the diseased surface at the same time with the electrical current, a chemical compound resulting from the action of the current upon the medicament employed as the electrode. The advantage claimed for this mode of application, is the penetration of the newly formed compound into the tissues, being carried in by the current, the application being necessarily made by means of the positive pole. Dr. Goelet has probably had a larger experience in this method than any other physician in this country, and has done a favor to the profession in making public the results of his experience.

A New Method of Direct Fixation of the Fragments in Compound and Ununited Fractures. — By Nicholas Senn, Ph. D., LL. D.

This paper consists of an address delivered by Dr. Senn, President of the American Surgical Association, at its meeting, May 3, 1893. Dr. Senn is already world famous for the additions which he has made to modern surgery; nevertheless he goes on industriously with these additions, and the close attention which he has recently been giving to bone-surgery has enabled him to make improvements upon the methods heretofore in use for the uniting of the ends of separated bones, which seems to be as important in this department of surgery as those which he has made in relation to intestinal anastomosis. In the present paper, Dr. Senn has presented a concise summary of the best methods heretofore in vogue for uniting the fragments of a broken bone, as well as his own improved method, by which means the superiority of the new method presented is made the more clearly apparent.

Cancer and Its Treatment.— By Daniel Lewis, A. M., M. D., Ph. D. Geo. S. Davis, Detroit, Mich.

This is a timely little work written by a physician who is perhaps the best qualified of any in the United States, to speak authoritatively upon this subject. For more than twenty years, Dr. Lewis has earnestly pursued the study of cancer and its treatment as a specialty, having

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spent some time in preparation for this special study at the great Cancer Hospital of London. It was largely through the personal efforts of Dr. Lewis that the Skinner Cancer Hospital of New York was established, and as a surgeon in this institution, Dr. Lewis has for many years enjoyed unequaled opportunities for the study of this disease and the testing of the various modes of treatment of cancer which have been proposed. No one who wishes to understand the present state of medical knowledge relating to this disease, can so well acquaint himself with the subject in any other way as by the study of this handy little volume.

Medical Microscopy.—P. Blakiston, Son & Co., Philadelphia. $2.50.

An admirable little work, which presents in a concise form all that is absolutely necessary for a medical student to know about microscopes and microscopic technique, and microscopical examinations of the various fluids and tissues of the body. The engraving is very excellent. The work is well adapted for use as a text-book, and ought to prove very popular.

Nursing.—Its Principles and Practice for Hospital and Private use.—By Isabel Adams Hampton. W. B. Saunders, Philadelphia. $2.00.

This is not only the latest but the best American work which has yet appeared upon the subject of nursing. We think a fair comparison with the best English works upon the subject will show it to be superior to any other similar work which has yet appeared in print. It places the work of the nurse fully abreast of the results of modern researches in scientific medicine, so that the nurse who has rendered herself thoroughly familiar with the instruction which it contains, is well prepared to co-operate intelligently with any physician or surgeon who stands in the front rank of medical progress. The work will unquestionably soon be adopted as a text-book in all the most progressive training schools for nurses, and will contribute largely to the advancement of professional nursing.

Des Fosses Nasales.—By Dr. Marcel Natier, Paris.

This monogram relates the particulars of two cases illustrating that quite rare condition, polypus of the nasal septum, both of which were successfully treated by galvano-cautery.

Analytical Studies of the Species of Fresh Water Algæ.—By Alfred C. Stokes, M. D. E. F. Bigelow, Portland, Conn.

The close relation of bacteria to algæ and other low forms of life, renders a knowledge of the algæ, desmidiæ, and fungi essential to modern bacteriologists. The classification followed in this work is that of the Rev. Francis Wolle.

Patriarchs and Prophets.—By Mrs. E. G. White. Pacific Press, London.

This is a remarkable work, written by a remarkble woman. It presents the lives of the prophets and patriarchs of olden times, not in the light of the higher criticism, nor even that of the ordinary Bible critic, but in the light in which these holy men are seen and understood by one whose mind has been enlightened by a torch from the heavenly altar, and who seeks to draw from the experiences of the worthies of old, lessons of faith, of warning, of encouragement, and of instruction which may be a help and a guide in the every-day experiences of the Christian believer. The work is written in the simple, forcible style characteristic of all

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Mrs. White's writings, and breathes on every page a spirit of reverence and true devotion, of earnest love for God and humanity, which is certain to impress the reader with the thought that divine guidance has helped the pen which traced the lines of this soul-inspiring volume. We are glad to note that the work, although newly from the press, has passed through several editions, and that thousands of homes are already made better by its reception. The mechanical execution of the book is excellent,— indeed we have rarely seen so beautiful a volume as this one which the publishers have recently placed upon our desk. The work is published in various styles, the particulars of which may be obtained by addressing either of the following publishing houses: Pacific Press, New York; Pacific Press, Oakland, Cal.; Review and Herald, Battle Creek, Mich.

Modern Gynecology.— By Charles H. Bushong, M. D. E. B. Treat, New York. Price $2.75.

This work is not claimed to be a compendious treatise upon gynecology, but undertakes to set forth the practical, every-day treatment of the diseases of women as carried out in our great city dispensaries at the present time.

The Medicine Lady.— Cassell Publishing Co.

A medical novel which talks sometimes sense and sometimes nonsense, about doctors and nurses, dispensaries, hospitals, house physicians, probationers, schools of medicine, heredity, consumption, and whatever else the author thought he could use to point a moral or adorn his tale. The principal interest of the work consists in the fact that it presents, in a popular way, many phases of medical life which are perhaps not much understood by the laity. As a literary production, it possesses no extraordinary virtues, but for those who have time to spend in reading literature of this sort, it might prove quite entertaining. Really, however, it is the opinion of the writer that we have quite enough of this evanescent sort of literature, and that the world would be quite as well off if the production of novels and the whole class of allied literature should cease for a decade or two.

Bible Readings on Health and Temperance Topics. — By W. H. Wakeham. Good Health Pub. Co.

This little work, which has been in preparation for more than a year, presents in a concise form the subject of health from the standpoint, and in the language, of the Scriptures. Its seventeen chapters deal with the various phases of the subject in a manner calculated not only to instruct but to interest the reader. To those who have not previously made a study of the Bible from a health standpoint, this book will be a revelation.

The Germ-Plasm. A Theory of Heredity. — By August Weismann. Charles Scribner's Sons, New York.

This work is perhaps the first serious compendious attempt which has ever been made to solve the mystery of heredity. Darwin's doctrine of Pangenesis very soon proved itself inadequate even to explain those phenomena of heredity which had been observed at the time his theory was propounded. But since that time, numerous other exceedingly interesting and important phenomena have been observed and studied, which have thrown much light upon this intricate question, and it is with a full view of these later developments, and a remarkably broad and precise knowledge of the whole subject, that Prof. Weismann has propounded his theory of germ-plasm. In the course of the work, Prof.

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Weismann discusses, incidentally, various theories which have been propounded in explanation of the diverse manifestations of the great physiological principles of heredity. He backs up his theories with an array of facts which, although they cannot be said to afford absolutely positive evidence, furnish at least a basis for the strong presumption that the theory advanced, if not the whole truth, and nothing but the truth, in relation to this subject, at least contains the germs of the correct explanation of one of nature's greatest mysteries.

Essentials of Bacteriology.— By M. V. Ball, M. D. W. B. Saunders, Philadelphia. Price $1.00.

This little work is unquestionably the best of the smaller works on bacteriology. It contains in a condensed form about all that is known on this question,— at least all that is necessary for the student to know in laboratory work, in those forms of bacteria, the characteristics of which are known with any considerable degree of precision. A very useful feature of the work is a table extending through more than forty pages, which presents the chief characteristics of all the principal bacteria. The facts noted comprise the following points: Name, genus, biology, product, culture, characteristics, actions, habitat, and discoverer. We know of no other volume in which so much valuable matter relating to bacteria can be gotten at so quickly as in this. We cannot commend it too highly.

The International Medical Annual and Practitioner's Index.— By E. B. Treat, New York. Price $2.75.

The rapid advances being made at the present time in every department of rational medicine, renders absolutely necessary the condensation, in convenient reference books, of the principal new discoveries and other advances made in this department of science, so as to place in permanent form the results of each year's progress. The practitioner who has abundance of time for research, and the specialist who wishes to keep himself fully abreast of the advances made in his particular line of work, find their wants supplied in the compendious annuals and reference books which are annually presented to the profession by several publishing houses; but the busy practitioner who has little time for reading, and who wishes to get at the pith of all that is best and newest, will find in "The International Medical Annual" a work exactly suited to his needs. The present volume, the 11th in the series, contains a number of excellent lithographic plates besides half-tones and numerous other illustrations, which illuminate the text and add to the utility and attractiveness of this handy little volume. The arrangement is excellent, and the large amount of ground covered in so small a volume, evinces the great care with which the work of condensation and compilation has been performed.

Perityphlitis.— By F. C. Schaefer, M. D., Chicago.

Prof. Schaefer takes issue with Mc Burney and other recent writers, in relation to the theory that 98 per cent of the cases called perityphlitis are really cases of appendicitis, calling attention to the statement by Treves, that 80 per cent of all these cases get well spontaneously, affording no opportunity for autopsy. Dr. Schaefer believes that a majority of these cases are cases of cæcitis or pericæcitis, and not appendicitis. The writer's observations lead him to hold with Dr. Schaefer in this matter. If this view is correct, it is evident that a very small proportion of these cases require operation, instead of nearly all, as has been advocated by some surgeons.

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MODERN MEDICINE

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BACTERIOLOGICAL WORLD.

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ORIGINAL ARTICLES.

A NEW DYNAMOMETER FOR USE IN ANTHROPOMETRY.

BY J. H. KELLOGG, M. D.

SOME twenty years ago I began the employment of calisthenics and Swedish movements, manual and mechanical, in the treatment of chronic invalids. Some years later I visited Stockholm, Sweden, and spent a little time under the tutelage of Prof. Hartelius, to enable myself to become better acquainted with the Ling system. For the last twelve or fifteen years I have made gymnastics a very prominent feature in the treatment of invalids of all classes coming under my care at the Battle Creek Sanitarium, and in this time have subjected to various forms of exercise, as curative means, more than 10,000 cases.

Early in my experience I became convinced that we have in voluntary muscular exercise one of the most powerful means of modifying nutrition. A more mature experience has fully established me in the belief that muscular exercise is one of the most valuable of all therapeutic agents. From the outset of my use of exercise as a means of cure, I appreciated a difficulty, which I have no doubt has been experienced by every person who has undertaken to make a definite prescription for exercise, which should be closely adapted to the needs of the individual for whom the prescription was made. This difficulty is found to be much greater in the employment of exercise for invalids than in that class of persons who usually come under the care of the physical director, owing to the very great degree of muscular asymmetry which is frequently encountered in invalid adults. In fact, it is a very rare exception to find among adults a person whose habits of life have not been such as to allow important muscular groups to fall into a state of idleness, and what might be termed, to borrow a political phrase, innocuous desuetude. This is well attested by the fact that such deformities as hollow chest, round shoulders, prominent abdomen, curvature of the spine, forward carriage of the head, and similar deformities, are so prevalent that the majority of men and women who have reached the age of forty years or over, furnish illustrations of one or more of these defects. Among chronic invalids, especially, it is exceptional to find a person who does not present defects of this sort, as I have shown in a series of outline studies of the human figure, which is presented elsewhere.[1]

In dealing with this class of persons, I experienced very great difficulty in adapting my prescriptions for exercise to individual cases. In fact, I found myself constantly at a loss to know exactly what my patient needed, and was frequently embarrassed by the fact that notwithstanding the exercise of the greatest possible care in making a prescription which I thought to be suited to my patient's needs, I had done harm rather than good, owing to the failure to recognize weaknesses which were quite as serious, though less manifest, than those which my prescription was intended to relieve, and which required a very different sort of prescription. I made use of the usual methods of anthropometry, exercising the greatest care in taking my measurements, but only to be disconcerted by the fact that patients not infrequently decreased in measurement while gaining in strength, or were discouraged

1 "Outline Studies of the Human Figure, comprising 118 Figures, which Embody the Results of Several Thousand Observations, embracing Studies of a Number of Different Civilized and Uncivilized Races."

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by making little or no change in their dimensions, notwithstanding hard and persevering efforts in the gymnasium.

I soon discovered that measurements were of very little value indeed in dealing with adult invalids, however useful they may be in the management of the physical training of growing boys and girls and undeveloped youths. I learned that quality rather than quantity was the thing important in dealing with adults — at least invalid adults. Through the assistance of Prof. Sargent I possessed myself of all the various forms of dynamometers which had been constructed for use in testing the strength of the muscles of the human body. I found, however, that these dynamometers had so little range of adaptability that only a few muscular groups could be studied by their aid, and finding myself daily embarrassed in consequence of my inability to meet the requirements of my patients, and being unable to avoid most unhappy blunders in my exercise prescriptions, in sheer despair I sought to attempt to devise some accurate means of testing muscular strength which could be adapted to the principal muscular groups of the body.

Having become accustomed, in the physiological laboratory, to the use of the mercurial column as a pressure indicator, I adopted this as a source of resistance, and arranged a simple apparatus consisting of a cistern containing about half an inch of mercury, which received the lower end of a long piece of barometer tubing. The space above the mercury in the cistern was completely filled with water, and with the cistern was connected, by means of three or four feet of rubber tubing, a strong rubber bulb about the size of an ordinary atomizer bulb. These were also completely filled with water. By compression of the bulb, the water contained in it was forced through the tube into the cistern, displacing an equal quantity of mercury, which was forced up into the glass tube. I found that a tube nine feet in height was sufficient to provide for as much resistance as was needed to balance all the force that could be brought to bear by a strong man in pressing the bulb. By means of various accessories, I arranged to apply to this bulb the force of all the principal muscular groups of the body,— extensors as well as flexors,— including the muscles of the trunk.

I encountered various difficulties, however, the chief of which were the gradual deterioration of the rubber bulb in use, and the frequent admission of air to the cistern by a change in level of the rubber bulb, causing the mercury column to disappear from the glass tube. Closure of the upper end of the glass tube enabled me to shorten the tube and diminish some difficulties, but it increased others. After several years' experimenting with the various forms of apparatus, I finally substituted a steel cylinder and piston for the rubber bulb, and connected this with the cistern by a metal tube, placing the apparatus upon a carriage which was made to slide up and down a vertical rod, so that there should be at no time any change in the relative positions of the cylinder and the cistern. In this arrangement I substituted oil for water, as in using water my steel cylinder and piston would soon become useless from rust. To my dismay, however, I soon discovered that the oil entered into combination with the mercury, and deposited a gummy precipitate upon the sides of the cylinder, seriously interfering with the movements of the piston, which must necessarily be as sensitive and delicate as possible. I tried various sorts of liquids without any advantage. Finally the thought occurred to me that the oil and mercury might be separated by means of water, the relative specific gravity of which would keep the oil above and the mercury below. This simple device enabled me to overcome the last serious difficulty in the construction of the machine, and some three years ago I had constructed the apparatus, a cut of which is herewith shown. This apparatus has since been in constant use in the Anthropometric Department of the Sanitarium at Battle Creek, Mich. It was also on exhibition in the Anthropological Department of the World's Columbian Exposition, and during the last year the dynamometer has been employed in connection with the Physical Culture Department of the Battle Creek College.

The dynamometer shown by Prof. Seaver in his work on Anthropometry, and which he has the kindness to commend, is my first instrument, which I discarded several years ago for the improved form which I have very briefly described.

In order to dispense with the long tube, Prof. Seaver suggested using a shorter

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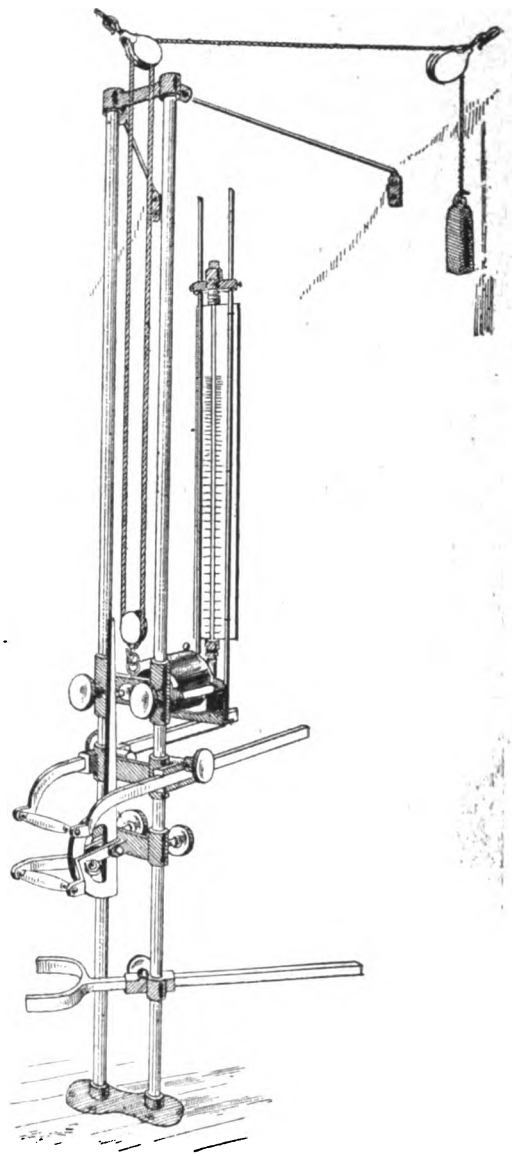
tube and closing the upper end. I have adopted this suggestion, and now use a tube one meter in length. At the upper end of the tube is placed a metallic stop-cock, which is closed after the machine is adjusted, so that the amount of air in the tube always remains the same. The scale of the instrument is made by the application of weights of known value to the lever connected with it, and has a range of one pound to 1000 or more pounds as the air contained within the tube is capable of affording an infinite amount of resistance.

With this dynamometer, which I have very imperfectly described, but which I think will be clearly understood by reference to the cut, I have made, and had made by my assistants, careful tests of the strength of the principal groups of muscles in several thousand adults — men and women. The muscular groups tested are as follows: Hand flexors and extensors, forearm pronators and supernators, arm flexors and extensors, deltoids, pectorals, and shoulder retractors, for the upper extremities; for the lower extremities, foot flexors and extensors, leg flexors and extensors, thigh flexors and extensors, thigh abductors and adductors; for the trunk, anterior, posterior, and right and left lateral muscular groups; for the neck, anterior, posterior, and right and left lateral muscles; for the chest, — inspiration, — the force of waist expansion; expiration being measured by means of Waldenburg's pneumatometer.

After obtaining the necessary data in the cases of 100 men and an equal number of women, I constructed a physical chart on a percental plan somewhat similar to that followed by Prof. Seaver in his anthropometric chart. In making this chart, the tedious mathematical work of which was done by one of my medical students, Mr. W. A. George, the figures obtained for each group of muscles were arranged in a column in regular order from the highest down to the lowest. Obtaining the sum of fifty per cent, of those found in the middle column, and obtaining the average, the result was put down in the center of the corresponding column on my chart. Forty-five per cent reaching five per cent above the upper level of the middle fifty per cent, were next massed together and the average found, and the result placed in the same column just above the previous result. Thirty-five per cent, thirty per cent, and so on down to one per cent of the numbers above the middle were cut out in like manner, the averages found, and the



New Form of Dynamometer, Designed by the Author for Testing the Muscular Capacity of the Human Body.

results properly placed. ▢ Proceeding in a similar manner, the figures were obtained for the lower half of the column. By treating the data obtained for each group of muscles in the body in this manner, I obtained a chart upon which I could

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make a graphic representation of the strength of the body, just as bodily dimensions have heretofore been graphically represented upon anthropometric charts and tables.

At the right-hand side of the chart, I arranged five columns for the totals of the arms, legs, trunk, chest, and the entire body, so as to bring under the eye at a single glance both the relative and the actual strength of the principal divisions of the body.

I have since prepared two other sets of tables, one based upon the data obtained from testing 600 adult men and an equal number of adult women of various ages between eighteen and sixty years, and another based upon the data obtained from 200 young men twenty to thirty years of age and an equal number of young women of the same ages. I was surprised to find, as, however, Prof. Seaver had predicted would be the case, that the figures obtained from the examination of 600 persons differed very little from those obtained in the examination of 100 persons of the same class. The chart based upon the examination of 200 healthy persons between twenty and thirty years of age, differs from the other chiefly in that the figures start at a higher level. In transferring the graphic representation of a person's muscular strength from one to another of these tables, I find that the characteristics, although slightly modified, always remain the same.

As a further test of the value of the chart, I have platted the figures obtained for the various groups of muscles, and find that excellent curves are made. In the case of the left foot flexors, for example, an almost absolutely perfect binomial curve is obtained.

The best test, however, for the value of this method of obtaining a basis for a prescription for exercise, is the fact that it meets in a most admirable manner the purposes for which it is designed.

The data afforded furnish exact information concerning the capacity of each of the principal groups of muscles in the body. Knowing the capacity of each muscle, it is easy to proportion the work in such a manner as to secure symmetry of development. My plan of accomplishing this, is as follows:—

Taking 300,000 foot-pounds, one sixth of a full day's work, as the proper daily dose of exercise for a man whose total strength capacity is 10,000 pounds, corresponding very nearly to the greatest capacity shown upon my table prepared from 200 young men in vigorous health, I undertake to establish the definite relation between the strength capacity and the total amount of work to be performed. This is easily accomplished by dividing the total amount of work done by the total capacity of the muscles; that is, 300,000 is divided by 10,000 giving 30 as the result. This indicates that in a symmetrically developed man with a total strength capacity of 10,000 pounds, each muscle, in order to do its proportion of the 300,000 foot-pounds' work prescribed, must do work to the amount of thirty times its lifting capacity represented in foot-pounds. It is only necessary, then, in order to ascertain the exact amount of work to be done by each group of muscles, to multiply by 30 the figures in each column of the horizontal line at the top of the table, multiplying each successive total by 30, and for each individual group of muscles by the same means.

I have made a careful approximate calculation of the amount of work to be done in each exercise, or set of exercises, with each apparatus in my gymnasium. It is necessary to know the strength of the medicine as well as the needs of the patient. Knowing the amount of work required for each individual and for each set of muscles, and also the result obtained from each exercise, it is very easy to construct tables of exercises exactly adapted to any capacity.

To make a prescription for exercise, I first note the total capacity of the individual, and write down a number which indicates the day's order which would secure for an individual of the given capacity the proper amount of work. Then glancing over the chart, I note the low points, and check or underscore each of these, which indicates to the assistant who superintends the exercise in the gymnasium, that the work is to be doubled on all such points, so as to secure to the weak muscle such rapid development and growth as will enable it to overtake the rest of the body, and thus secure muscular symmetry.

In practice, I find that this method never results in giving to a muscle more than a full day's work, and consequently there is no danger of injury resulting from

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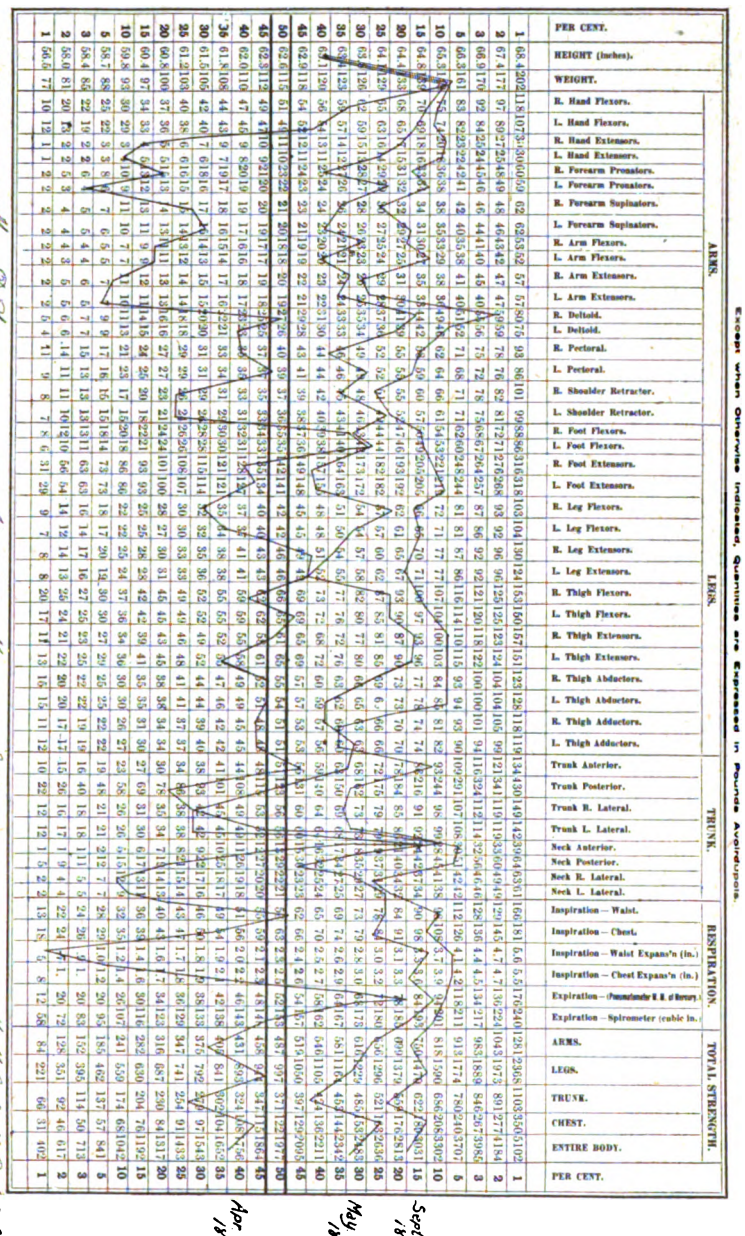
this doubling of the amount of work required of weak muscles. In case of complete paralysis of the muscle, it is necessary, at the beginning, to administer the exercise by electrical or mechanical means. As a rule, I find it sufficient, for practical purposes, to divide the series of total capacities represented upon my table into five groups, instead of making a distinct schedule of work at each of the levels indicated by the several quantities representing total muscular capacity.

The ratio which I have established between the muscular capacity and the day's work is probably too small for persons in vigorous health; but I find it well suited to the class of persons who come under my observation, who are for the


PHYSICAL CHART
Arranged from the results obtained in testing the strength of the individual groups of muscles in one WOMAN, by means of a Universal Recording Dynamometer, made and supplied under the direction of J. H. KELLOGG, M. D., Superintendent of the Sanitarium and Hospital, Battle Creek, Michigan.
Except when Otherwise Indicated, Quantities are Expressed in Pounds Avoirdupois.
Chart No. 1.
Strength Measurements of Miss D. H.
Taken May 6, 1892. May 21, 1892. Sept. 1, 1892. 189 , by M. L. G. & J. H. K.
Apr 6 1892.
May 8, 1892.
Sept. 1, 1892.

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most part invalids or semi-invalids. The man who is in training and desires to develop his whole body to its highest capacity, should of course be required to execute a full day's work, or 1,800,000 foot-pounds, and even more. In arranging a day's order of exercise, due account is of course taken for the work done in walking, running, and similar exercises which may be made a part of the program.

The patient does not undertake to do all the exercises prescribed in the series the first day, but gradually takes them up from day to day as he learns them and becomes able to do them, and by the end of two or three weeks is expected to have thoroughly mastered all the exercises given him, and to have become able to take each day all the exercises given him in his prescription.

At the end of a month, another chart is made and the changes noted, and a new prescription made according to the requirements. It is a matter of frequent observation that the points which at the first examination are lowest on the chart, are so improved by the specific exercise directed to these particularly weak muscles that the lowest points become the highest ones upon the second chart.

By means of this method, it is possible to obtain exact knowledge respecting the requirements of each individual case. Possessed of this exact knowledge, it is possible to make a prescription which will be exactly adapted to the wants of the individual. It is possible to make in less than a minute's time, a prescription which is more exactly adapted to the wants of the individual examined than could be made by the most elaborate study and the consumption of any amount of time, without the aid of the accurate data obtained by this method.

One of the charts herewith presented, that of Mr. A., shows the value of this mode of investigation in the diagnosis of morbid conditions affecting the motor system. This patient was suffering from paresis of the left arm. This would be apparent from the chart alone, without other evidence, as will be readily seen. The dynamometer picks out the particular groups of muscles which are affected by paresis or paralysis, and thus gives important indications respecting the location of the central lesion, of which the paralysis is merely a symptom. This chart also shows in a most interesting manner, the value of the dynamometer as a means of indicating the progress made by a paretic patient under treatment.

Another advantage in this mode of studying the motor apparatus is the fact that the dynamometer tests not only the muscles, but the nerves and nerve centers as well, so that it is a precise measure of the condition of the individual's motor apparatus. It is a true measure of the dynamic energy of the body, and shows the actual ability of the individual to manifest energy through his muscular system as a whole and through each particular part of it. The tape-line merely gives the dimensions of a man, — it tells nothing as to whether he is alive or dead. A dynamometer gives us an accurate picture of the living, active man. The chart obtained by means of the dynamometer enables the physical director to make a precise prescription for exercise without even seeing the subject, whereas the data furnished by the measurements of the tape-line may relate to a man who is dead, or so completely paralyzed that all forms and degrees of exercise are alike impossible; so that without the aid of the dynamometer, anthropometry is a most unreliable guide and almost altogether useless, unless the subject is before the director, who, even then, is obliged to depend upon his intuitions and his experience in arranging a program for gymnastic work, rather than upon the indications of the tape-line.

After several years' use of my dynamometer and the charts which it has enabled me to prepare, I am so thoroughly dependent upon these means of directing the gymnastic work of my patients that I should be utterly at a loss to know how to prescribe for them without this or some equally good means of exact diagnosis.

I ought, perhaps, to have said another word respecting the method of using the dynamometer. I have worked out an exact mode of testing each group of muscles. This method is followed with precision in each test made. The general principle which I have followed is that the resistance of the dynamometer should be applied at the distal end of the bone which is operated upon by the group of muscles under examination, and in such a manner as to give the muscle an opportunity to act to the best advantage, at the

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same time isolating its action from that of other groups which might vitiate the results obtained.

I have found very interesting, a study of the relative strength of the different groups of muscles in men and women, and also the comparative study of the tables obtained for the two sexes. But this subject is too large to be entered into in this brief paper, which is intended to be simply a description of the dynamometer and its use. I hope to present at some future time a paper which will embody the results of a critical study of the data presented by these tables, and others which I am now preparing upon a somewhat different plan, which combines the average and the percental methods, and will give for each group of muscles an almost absolutely perfect bi-nomial curve.

COMBINATION HOT FILTER AND STEAM STERILIZER; A HANDY INCUBATING CAGE.*

BY F. W. MALLY, M. S.

THE fitting of agar-agar or other solid media is often attended with great difficulty in winter, due to the rapid cooling and thickening of the hot liquid. A separate piece of apparatus requiring additional gas and burners is in common use. Not having an assistant and in order to economize time and expense, the following combination of the steam sterilizer and hot filter was devised. (See cut, next page.)

The lower portion, A, is the same as that of any ordinary steam sterilizer. This particular one was ten inches in diameter, one foot high, with three circles of tips, *a*, *a*, *a*, on the inside, upon which to lodge the perforated diaphragm, B, at various heights above the water. The legs, *b*, *b*, were high enough to allow an ordinary two-burner oil stove to be placed under. The top or lid, C, was made eight inches high, of the same diameter as the lower portion, fitting into it tightly, so as to avoid as much as possible the escape of steam, and consequent decrease of pressure. Through the center of this cover is fitted an inverted frustum of a cone, *d*, about three inches long, four inches in diameter at the outer end, and about two and a half at the inner one. For this cone or collar a tight-fitting lid like that of a tin pail is provided, in order that the same top may be used for hot fitting or other purposes. At one side of the top a second small collar, *e*, is fitted for the reception of a thermometer; on the side, a thin, slightly, blunt handle, *f*, for convenience in lifting the top on and off.

The funnel collar should not extend more than a half inch above the level of the top, so as to allow almost the whole of the funnel to be inside the sterilizer. As in other sterilizers, asbestus, *g*, is used as a cover or binding in the usual manner, to prevent excessive radiation of heat.

When the liquids of solid media are to be filtered, the flask containing the medium is placed in the sterilizer, and thoroughly warmed. At the same time a second empty flask is put in on the diaphragm and the top placed on. The funnel to be used is fitted with the necessary filter paper, and the whole inserted through the collar, *d*, in the top of the sterilizer. The steam around the funnel on the inside heats it, while at the same time the steam escaping through the neck of the funnel, moistens the filter proper. When the liquid to be filtered reaches a suitable temperature, the flask containing it is taken out, the hot funnel at once fitted through the collar, *d*, into the empty flask inside the sterilizer. The liquid is then poured into the funnel, and the filtering has begun. The body of the funnel being inside the sterilizer, the steam has full play upon it, keeping it and the liquid at a high temperature during the process. At the same time other flasks containing media may be placed in and partially sterilized while the filtering proceeds.

The flask receiving the filtrate is inside the sterilizer, and hence any danger of contamination from falling germs in the atmosphere of the room is avoided.

For some media the pressure of the steam in the neck of the funnel checks the rapidity of filtering. To avoid this a *ruffled* collar instead of the perfectly circular one can be made, as shown in the figure. This allows the escape of steam around the outside of the funnel and relieves the pressure. If this is done, the

*Adapted from Bulletin No. 29. Division of Entomology, U. S. Department of Agriculture, being the author's final report upon the Bollworm of Cotton (*Heliothis armigera*, Hübu).

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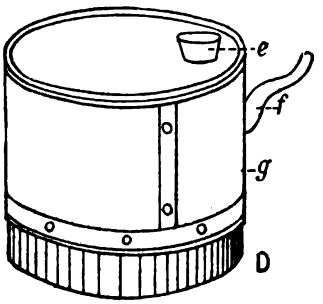

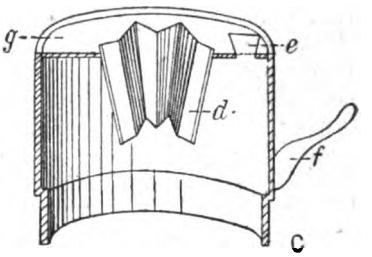

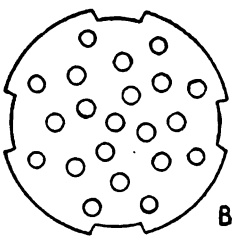

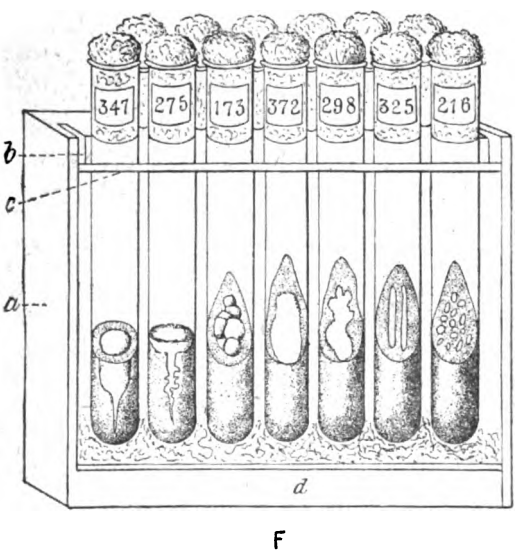

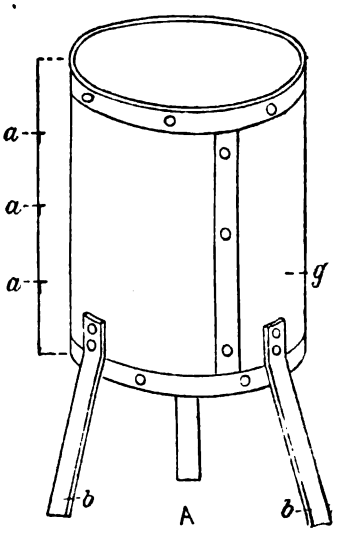

INCUBATING CAGE, DEVISED BY F. W. MALLY, M. S.

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lid to the collar must be made to fit accordingly. If desirable, a plain top, D, can be made for use in ordinary sterilizing.

Another piece of apparatus which can be called an "Incubating Cage" (Fig. F), in some respects materially facilitates work. The cages in which culture tubes are usually placed when transferred to the incubator, are the well-known wire cages, holding some twenty or thirty tubes. The disadvantage of the cages for such use lies in the fact that when many cultures are made and kept in them, neither the lables on the tubes nor the nature of the growth can be noted, even superficially, without taking out each individual tube. This difficulty is overcome in the cage shown. Its frame consists of wooden strips ⅜ or ½ inches in thickness and about one and a half inches wide. The two upright ends, *a*, *a*, should be about four inches high, with grooves, *b*, cut along each side, into which plates of ordinary window glass, *c*, can be slipped. The two uprights are dovetailed into the horizontal piece, *d*, and firmly pegged and glued. This done, the two plates of glass are inserted, the bottom covered with cotton to a depth of half an inch, after which the culture tubes can be placed in. The slanting surface of solid media should be turned to the outside, and the label at the top of the tube should also be on the same side. In this way no difficulty is experienced in speedily finding any tube desired and watching from the outside what progress any growth may be making. The cage should be wide enough to receive two rows of tubes, as then there is no danger of its falling over easily. The cages can be made of any desired length, and the uprights of any height and width demanded for the test-tubes in use.

THE NON-SURGICAL TREATMENT OF OVARIAN DISEASES.

BY J. H. KELLOGG, M. D.,
Battle Creek, Mich.

(Continued.)

HUNDREDS of similar cases might be recounted, but I deem these sufficient to demonstrate the curability of a large class of ovarian disorders, many of which, failing to find relief by the measures ordinarily employed, fall into the hands of gynecological surgeons and suffer the mutilating operation of ovariotomy, when a thorough cure would have been entirely possible by the employment of comparatively simple measures. It is very rare indeed that cases of this sort come under my care, in which a cure is not effected. Sometimes a case is somewhat tedious, but this may be the result of failure on the part of the patient to co-operate physically, mentally, and morally as thoroughly as is necessary to secure the most complete and rapid results.

After twenty years' experience in the treatment of diseases of women, I have become convinced that a large share of the treatment ordinarily employed by gynecologists is mere temporizing. I say this, not in a spirit of criticism, but for the purpose of provoking inquiry, and leading, if possible, some professional brother to adopt measures which are certainly more thorough-going, and, to my mind, more rational in character. Nothing is more common, in my experience, than to meet patients who have been for years visiting two or three times every week the office of their family physician or some gynecological specialist to receive local treatment, without having apparently derived the slightest permanent benefit therefrom. I have frequently had patients who had spent ten or fifteen years in this way, drifting about from one physician to another, and from one specialist to another, until they had become almost tired of life; so disgusted were they with the continual round of pledget-placing and the continual disappointment which had attended their efforts.

Gynecology is unquestionably the most rational department of practical medicine at the present day, nevertheless it too often happens that the specialist does not find it convenient to bring into operation all the rational treatment which gynecology recognizes and affords, but depends, instead, upon these temporizing and merely palliative measures, such as pledget-placing and local treatment. It sometimes happens that women are apparently cured of transient or acute chronic displacements, whether of the uterus or ovaries; but such disorders of the uterus and ovaries as give rise to severe menstrual pain and pelvic discomforts

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are rarely if ever cured by this means. The cure of these disorders requires much more thorough-going and efficient measures. It is necessary to aim our therapeutic measures, not at the specific local morbid condition alone, but to take into account all the accompanying morbid conditions, and especially the disturbances in the static relations of the stomach, bowels, liver, kidneys, and other viscera which almost uniformly accompany uterine displacements and congestions, except when due to acute inflammation or traumatism.

Unfortunately, gynecologists, as well as other physicians, too often forget that recovery from a chronic disease is secured, not altogether by the dexterity of the physician in the manipulation of therapeutic agents, but by a process of growth on the part of the patient. The recovery of health by an invalid is just as much a matter of development as is the growth of a tree. There must be seed sown, cultivation of the crop, and patient waiting. The soil must be prepared by constitutional improvement; the weeds of bad habits must be rooted up by the establishment of a correct regimen.

My experience in the treatment of several thousand invalid young women, has convinced me that a lack of vigorous muscular development is one of the fundamental causes of a great share of the special ailments, congestions, hyperæsthesias, uterine and ovarian displacements, and that a substantial cure cannot be effected by any other means than by the development of the muscular system and the building up of a good physique. This alone is many times sufficient to accomplish a radical cure. A young woman who has been spoiled by fashionable bringing up and education, who has never properly developed her body by muscular exercise, suffers from an abnormal nervous irritability, which renders any little mechanical disturbance of the static relations of the organs, pelvic or abdominal, a source of an enormous amount of pain and suffering. The tissues are filled with nerve-irritating poisons, which can be thoroughly eliminated only by the nerve-irritating poisons which excite the nerve centers and rasp and irritate the nerve trunks and nerve fibers until they are brought into a state which renders even the stimulus of ordinary contact with external things almost intolerable.

When such a woman consults a gynecologist, examination reveals the fact that she has sensitive ovaries. If she happens to consult an oculist, he finds a sensitive optic nerve. The specialist in the diseases of women, looking through his gynecological spectacles, sees only diseased ovaries as the point from which all of the patient's sufferings emanate. The oculist, looking through eye glasses of a different tint, finds in eye strain the sole cause of a multitude of neurasthenic symptoms. The neurologist finds in spinal irritation the key to all the pathological problems which the case presents. If the patient happens to fall into the hands of a rectal specialist, rectal papillæ and pockets afford an equally lucid and satisfactory explanation of every symptom, local or remote. Very likely all are right, yet all are wrong. All may be right in finding a source of reflex irritation in each of the locations mentioned, and these patients are so susceptible to mental and nervous impressions that they may apparently be cured by treatment of either the eyes, spleen, rectum, or ovaries. But unfortunately, cures effected in this way are not permanent. The patient sooner or later relapses into the old state again, and something else must be done.

I have frequently had under my care, cases in which a poor woman had gone the rounds of all the different classes of specialists mentioned. A skilled oculist had operated upon her eye muscles and dextrously trimmed and balanced the internal recti until not the slightest suspicion of muscular insufficiency remained, and the patient was apparently better, but speedily a return of all the old symptoms had demanded a resort to some other means of relief. At this time the ovaries happened to be the chief seat of expression of the morbid state, and a gynecologist was consulted. In one case the ovaries had been actually removed, apparently to the great relief of the patient, but another relapse led her to consult, through the influence of friends, a rectal specialist, and the rectum, after indefinite trimming and pruning, had finally been actually removed by performance of the so-called "American Operation," — more properly the operation of Whitehead, consisting of the amputation of the lower inch of the alimentary canal. Still the poor woman suffered, having previously undergone

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treatment for years for "spinal disease," including rest cure, electricity, blisters, and various repulsive applications, and finding herself no better after all her experiments, was quite in despair. But the patient got entirely well without any special treatment whatever, by simply building up her whole system, making her constitutionally and vitally stronger.

It is not simply better ovaries, better rectum, better eye muscles, and better nerves that these patients need, but better bodies. They need to be placed on a higher plane of animal life; they need a general re-inforcement of vitality and animal vigor. It is the *vis medicatrix naturæ* which cures the patient, not the doctors, nor the remedies administered. Doctors may serve as pilots, and remedies may act as sails to catch the breeze, but the wind that blows the invalid's bark into the haven of health, is the vital energies of his own tissues. Doctors may do much in the direction of what might be termed "raising the wind," but the getting well the patient herself must do. Every intelligent man must be familiar enough with these principles, but in practice they seem to be too often ignored.

In dealing with quite a large proportion of cases of functional ovarian derangements, it is only necessary to put the patient on a higher vital plane to relieve her of all local suffering. I have often had occasion to notice the marvelous influence of muscular exercise in lessening nerve sensibility. Every gynecologist who has had any extensive experience in dispensary work, has seen, time and again, cases of poor women of the laboring class who had been going about for years with the uterus and a considerable portion of the rectum and bladder outside of the body, and yet apparently without suffering otherwise than from the mechanical inconvenience occasioned by the procidentia. On the other hand, a woman who has been daintily raised and whose physical education has been neglected, may suffer untold agonies from an ovary which has slipped down out of position, perhaps as the result of a misstep, a fall upon the ice, or a jar received in alighting from a carriage. Such a young woman suffers, not because of the gravity of the local ailment, but because of the abnormally sensitive state of her whole nervous system. If this young woman's tissues, muscles, blood, nerves, and nerve centers can be brought into the condition of the laboring woman, the nervous irritability and the local pain will for the most part disappear. This may be accomplished by exercise, and by skillfully managed physical culture, which also affords the very best means of attaining an actual cure, as it develops and strengthens the structures which serve as supports for the internal viscera, and the weakening of which is the most frequent cause of visceral displacement.

Local treatment must not be ignored. Physical exercise alone will effect a cure in most cases, but in the majority of cases, in which ovarian disease has become chronic, the patient cannot exercise without so much pain and suffering that anything more than very gentle exercises is quite impossible.

These cases require the most careful and discreet management. To send a patient of this class to a gymnasium for exercise with instruction to use her muscles, would be as absurd as to send a man requiring medicine of some sort to a drug store with the general instruction to help himself, or to take such medicines as he thought himself able to bear. At the beginning, exercises of the most gentle character must be employed. The patient may be quite unable to begin with calisthenics, or any kind of so-called gymnastics. Massage, manual Swedish movements, mechanical Swedish movements, or exercise of special sets of muscles, obtainable with precision by the aid of suitable electrical currents, and best in the writer's opinion, by means of a slowly alternating sinusoidal current,—these are the measures which it is necessary to employ on beginning with a chronic and severe case of functional ovarian disease. Ordinary measures of local treatment, by means of medicated pledgets with the vaginal douche, etc., should not be forgotten. I consider these local measures of treatment of very great importance, and in many cases add pelvic massage with great advantage, although this is a measure which needs to be used with great discretion, and requires a great amount of experience and training of the fingers and hands in order to obtain any benefit from it, and to avoid most unhappy results.

(To be continued.)

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

PATHOLOGICAL PHYSIOLOGY OF NERVOUS SHOCK.

H. ROGER reports in the October number of the *Archives de Physiologie* the results of an interesting series of investigations for the purpose of determining what pathological conditions are characteristic of death from nervous shock, and several very interesting facts were noted. Pathological anatomy gives us no information upon this subject, but certain functional disturbances have been found to be characteristic. M. Brown-Sequard some time ago pointed out the fact that the brain is more dense in consistency after death by nervous shock than under ordinary circumstances. Visceral congestion has also been observed. Another remarkable fact observed by M. Brown-Sequard and others is, that the venous blood is red, showing an arrest of tissue changes. This is due, according to Brown-Sequard, to an inhibition of the attraction of the tissues for the blood, which he holds to be one of the causes which aid the capillary circulation. D'Arsonval analyzed the venous blood and found it to contain less carbon dioxide than in a normal condition. Analyses of the expired air show a corresponding diminution of CO_2.

A marked lowering of the temperature has been noted as the natural result of the arrest of tissue changes. In another case the temperature of a guinea-pig fell in one hour from 39° to 30° C. At the end of four hours and twenty minutes, it reached the low point of 19.5° C. In another case a guinea-pig weighing three hundred and ninety-five grams, lost 21° C. in one hour.

After death, animals killed by a nervous shock cool very quickly. A guinea-pig lost 9.2° in thirty minutes after death by nervous shock. A guinea-pig which had been strangled lost only 4.6° in the same time. The body of a guinea-pig which had been dead five or six days, when heated to the temperature of the live animal, lost 5.7° C. in thirty minutes, only about half as much as was lost by the animal dying as the result of nervous shock. It was suggested that there is some means by which there is an actual production of cold, or rather by which a portion of the heat of the animal becomes latent.

[M. Roger makes no explanation of these curious phenomena; but it occurs to us that it may be the result of evaporation, which probably occurs more rapidly from the surface of the recently dead body than from the surface of an animal which has been dead for a number of days, during which time its skin must have become more or less desiccated.]

The respiratory rhythm is distinctly modified during the nervous shock, being slower and more superficial than under normal conditions. The cause of this is evidently a diminution in the quantity of carbonic acid gas which constitutes one of the means by which respiratory rhythm is maintained.

An interesting modification of the circulation is also observed. In these cases, the surface vessels are contracted, and as a consequence, the descending line of the spygmographic tracing is less concave than in normal conditions. Dilatation of the capillaries is sometimes observed.

Cerebral activity is also seriously modified. There may be more or less complete loss of consciousness or of will, due to the lessening of the blood supply. According to Fischer there is a paralysis of all of the vaso-motor nerves, that of the splanchnic being the most marked. The other nerves are in a state of hyper-excitability, some of them responding to an exceedingly slight stimulus.

The muscles are in a state of increased excitability. Incontinence of fecal matters and the retention of urine are observed. This is due to the fact that expulsion of matters from the rectum requires less force when the rectum is full than does the retention, while, on the contrary, more force is required to expel the urine than to retain it. The secretions are modified in a remarkable manner. Under the influence of fear the mouth becomes dry; on the other hand, there may be polyuria; there is consequently no general rule. In most cases, however, the secretion of the kidneys is either diminished or abolished. This result is easily obtained by any painful excitation, as for example, electrization of the central end of the sciatic nerve.

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The secretions of the spleen are usually abundant. Cold sweat is one of the most frequent symptoms of shock.

Perhaps one of the most remarkable observations which have been made is the slowness with which decomposition occurs after death from nervous shock. Brown-Sequard has seen decompositions delayed until the twentieth day, in a guinea-pig killed by a puncture of the bulb, and the forty-seventh day in a dog. Similar facts have been observed in the human species. In the body of a woman who died the twenty-sixth of March, 1867, from laceration of the uterus, putrefaction had not yet begun on the twenty-third of the following June, three months subsequently.

The study of the pathological physiology of shock leads to some interesting therapeutic conclusions, which may be briefly summarized as follows: —

Since shock results from excitation of the nerve centers, it is important to follow the precepts of the English authors in preparing the patient for operation by accustoming him to the idea of the mutilation which it is necessary for him to undergo. In some cases it is necessary that the patient should for some days or even for some weeks previous to the operation, maintain a state of absolute rest. The use of chloroform has greatly diminished the frequency of shock, but the anæsthesia must be carried sufficiently far to produce insensibility to pain, or otherwise the nerve centers will be placed in a condition which favors the very thing we wish to avoid. Jordan has formulated the following aphorism: "The less there is of nervous energy, the less chance will there be of shock."

When a shock has occurred, the first indication is to combat the tendency to depression of temperature. Placing the patient in a well-heated room, envelop him with blankets, and apply friction of the skin, and if necessary a warm bath, the temperature of which is progressively increased. These are measures well calculated to antagonize the tendency to a great depression of temperature.

Stimulating drugs have been generally employed in this condition, but the results have been bad. Alcohol, musk, belladonna, atropia, digitalis, opium, or morphine are at present recommended by English surgeons. The majority of English surgeons have observed that these different substances produce little effect. Large doses of these drugs may be administered, even hypodermically, without producing any reaction, and without the least intoxicating effect. This is due to the fact of the arrest of tissue changes. The tissues cease to throw off the substances which are developed in them, and also fail to take up from the blood those substances which are found in it. Experiments have shown that strychnia is without effect upon a frog in a state of shock, even when injected into the veins.

Since the respiratory disturbances depend upon the diminution of the amount of carbonic acid gas contained in the blood, Brown-Sequard thinks that it is important to prevent, as much as possible, the exhalation of CO_2, and to increase its production. To accomplish this, two means are at our disposal. The amount of CO_2 produced by the muscles may be increased by the application of electrical currents. The exhalation of CO_2 may be diminished by causing the patient to breathe in an atmosphere charged with CO_2. An indication in a state of shock is exactly the opposite of that in a case of asphyxia.

THE STOMACH AND THE CORSET.

Dr. A. Mathieu (*Gazette des Hopiteaux*), in a recent article which we translate as follows, calls attention to the injuries resulting to the stomach from corset wearing: —

It is indisputable that many women and young girls suffer from digestive troubles more or less marked in character, as the result of corset wearing. The etiology of dyspeptic disorders is certainly complex. They may be attributed to chloro-anæmia, nervousness, and atonic constipation, so frequent in women, etc. The corset may also act indirectly as a cause of disease. It limits the respiratory movements, and consequently, oxygenation, thus increasing the tendency to anæmia. A certain number of young girls also eat an insufficient amount of food; it may be because they wish to preserve their smallness of waist (which is the envy of their friends), or because, in consequence of the constriction of their clothing, they experience, after eating, more or less pain, due in part to the fact that such persons frequently

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suffer more or less from flatulent dyspepsia.

It is not surprising, then, that physicians, from its first appearance, have recognized and called attention to the dangers resulting from corset wearing. Their warnings have, however, usually been in vain. Women admit without discussion that they suffer for the sake of good looks. They console themselves for their dyspeptic troubles which render them prematurely old, by the fact that they have gained a few inches decrease in waist measure.

The long and tight corset, such as fashion demands, is a sort of inverted cone which incloses the thorax, the natural form of which represents a cone with the base downward. The pressure of this external cylinder tends naturally to reverse the form of the thoracic cone. The abdominal organs lying beneath the diaphragm, must consequently undergo a dislocation and disturbance of their relations to the deformed and restricted thoracic cage. The stomach, forced downward and to the left by the liver, tends to become vertical. The pylorus is lowered at the same time that it is carried toward the left, and a constriction of the duodenum is formed, which may be equivalent to an actual stricture. As a result, there is a stasis of fluids in the most dependent portion of the stomach, and a division of the stomach into two sacs, as indicated by M. Clozier, the superior pouch communicating with the inferior pouch by a restricted portion,— a sort of neck,— the movements of respiration causing, by aspiration and by successive pressure, the alternate passing of liquids from the superior into the inferior pouch, and the reverse.

The contact of the fluid contents of the stomach with the gas gives rise to a peculiar sound. "This bruit hydro-aëric," said Clozier, "is perceptible at a distance of some yards, and is synchronous with respiration." One can compare it to the cooing of certain birds. This sound disappears when the abdomen is compressed by belts, or by other means. It disappears also in the last months of pregnancy.

These patients often experience more or less severe pains or cramps three or four hours after eating. These painful sensations are due to efforts made by the stomach to unload itself of the solid and liquid substances which it contains.

These symptoms are often confounded with those of hyperchlorhydrie, but they do not occur with the same regularity. They are capricious in character, being sometimes absent, while the pains of hyperchlorhydrie appear regularly after every meal. They are not relieved by alkalies in large doses, and examination of the gastric juice shows that there is no excess of hydrochloric acid. There may be, of course, a coincidence of vertical dislocation of the stomach and hyperchlorhydrie, a condition which renders a diagnosis very difficult. [In these cases the differential diagnosis is easily made by means of a quantitative examination of the stomach fluid, after the method of Hayem and Winter.]

We often observe, in these cases, symptoms of atonic dyspepsia: weight, fullness after eating, pain, disturbance of respiration, regurgitation, constipation, etc. Mobility of the right kidney is very frequently occasioned in women by the same cause. This is due, as pointed out by M. Bouchard, to the dislocation of the liver, by which the right kidney is forced into the abdomen.

Again, in vertical dislocation of the stomach there is a tendency to prolapse of the pylorus, and consequently a sharp bending of the duodenum. When this bend occurs at the point where the bile duct enters the duodenum, the bile may by its own weight pass into the stomach through the upper portion of the duodenum and the dilated pylorus. In consequence of the entrance of a considerable quantity of bile into the stomach, marked troubles of digestion and nutrition may result.

The above is a summary of the anatomical facts and physical phenomena, which, according to recent investigations, may be attributed to the compression of the corset. If it be suggested that in these there is much that is theoretical, it is only necessary to remark that the vertical condition of the stomach and mobility of the right kidney are much more frequent in women than in men. The respiratory gurgle heard by many authors, and ascribed by M. Clozier to a double sacculated stomach, appears to pertain exclusively to this condition. There are here reasons for belief that we have to deal with facts, and not with

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theoretical hypotheses. The cause being known, the prophylaxis is very simple. If we cannot undertake to suppress the corset, it should at least be rendered harmless. It should then be soft, short, and loose.

The habit of tight lacing is the result of bad education and coquetry. Young girls, even those who have the least need of it, consider the corset as a garment which it would be indecent to discard. They acquire the habit of being sustained by the corset, the weight of the upper portion of the body being transmitted to the hips through the corset. They wrongly take pride in a waist as small as possible. They believe that a filiform waist is the highest mark of feminine beauty. It would be well for them to understand that no one but young girls and young women entertain this idea.

It is not easy to remedy the morbid conditions induced by the corset. The marked dislocation of the viscera, especially the mobility of the kidney, requires the use of the abdominal bandage. It is also necessary to employ appropriate means for the relief of the dilatation of the stomach and the gastro-intestinal atony. J. H. K.

DIETETIC TREATMENT OF DIABETES MELLITIS.

PROF. NAUNYN, of Strasburg (*Zeitschrift für Hygiene*), divides diabetes into three forms: 1. The severe form; 2. The medium form; 3. The mild form.

In treating the severe form, the author begins with a strict meat diet, 500 grs. (about 1 pound) per day. This in some cases proves advantageous; but if this should not be the case, then milk should be given in graduated doses, one fourth to one half liter (quart) with 20, 30, or 100 grs. (two thirds of an ounce to 3 ounces) of bread. Vegetables are allowed in small quantity. The meat ration may be increased later.

The medium form also presents a picture which must be regarded as quite grave in character. The sugar amounts to from five to ten per cent. It is the radical success of treatment with a strict meat diet which distinguishes these cases from the severe or grave form. The sugar decreases in three or four days from two to one per cent. In another week, or at most, after fourteen days, the urine becomes entirely free from sugar. In many cases, improvement of the whole case appears simultaneously with the gradual disappearance of the sugar. The general health of the patient is often very bad for the first few days, but the morbid sensations of hunger and thirst, the skin-itching, neuralgia, etc., soon disappear. In case the weakness becomes alarming, the appetite impaired, or the iron chloride reaction of the urine very distinct, the strict meat diet should be stopped immediately. The iron chloride reaction often appears at the beginning of treatment, or becomes more marked, if it has already existed. If no other critical symptoms appear, the treatment need not be interrupted. This dangerous reaction diminishes after from two to four days, and soon disappears entirely. When the case progresses favorably, if the reaction should become more marked, the strict diet should be entirely discontinued, for the reason that with this reaction the secretion of oxy-butyric acid goes hand in hand, and with a marked increase of the latter, there is danger of coma.

According to his observations, the author recommends, for the medium form of disease, the following treatment: First, an absolute meat diet. If the sugar disappears, and if the regimen agrees with the patient, continue it as a strict regimen for three or four weeks. If, at the end of the second week, the weight is still decreasing, the meat ration may be increased to 600 grs. (twenty ounces). After four or five weeks, make a trial of a change in diet by adding eggs and milk or bread, but the latter only in very small quantities. Should a small quantity of sugar (less than one per cent) appear as the result of this experiment, keep the urine under constant observation for a few days, and notice whether a decrease or an increase takes place. If there is a decrease, the sugar may disappear entirely after some days; but if the percentage of sugar is very greatly increased at once as the result of the change of diet, we must go back again, for eight or ten days, to the strict diet, and then try the same experiment again. If either at the first or the second attempt, a successful result has been obtained, the patient bearing the increase in diet well, without an increase in the

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amount of sugar, the treatment may be carefully continued. The patient must be kept under careful observation and control until a definite regimen has been established. This radical treatment must be abandoned as soon as the patient cannot endure it; or if, with a second or third trial, by increasing the diet with small quantities of milk, bread, and vegetables, the sugar reappears, after having previously disappeared, and has not disappeared again after some days, then the treatment should be so regulated as to maintain the daily secretion at thirty to forty grams per diem.

In most of the mild cases, the patients will be found able to bear large quantities of sugar-forming material. By means of a meat diet the sugar may be eliminated from the urine, even if, in the first few days, there is a loss of weight of from one to two pounds. The loss of weight is a matter to which especial attention should be paid, except in cases of excessive fat formation, in which we do not need to take this factor into serious consideration.

The bill of fare for a patient suffering with diabetes of a mild form, is the following: The flesh of any animal, in any form, prepared without starch or sugar. The daily meat ration should be from 500 to 700 grams (from sixteen to twenty-three ounces) carefully weighed and boiled. Fat in any form may be taken. Eggs may be taken freely. Bread, if taken at all, should not exceed one and one half to three ounces per diem. Vegetables and fruits are important, on account of the alkaline and earthy salts which they contain. The right turning (polariscope) carbo-hydrates, starch, and dextrine, the diabetic person consumes with difficulty, while he digests completely and without sugar secretion the left turning carbo-hydrates (levulose, inulin, and mannite). Of vegetables we can recommend especially, tobinambur, which is imported from China and Japan; Stachy's potatoes, which contain much inulin; artichokes; and green beans. To this class also belong mushrooms, on account of their mannite, and apples and peas, on account of the levulose which they contain. Sour milk, kumyss, kefir to the extent of one half to three fourths of a liter, may also be permitted.

J. H. K.

Test for Lactic Acid in Stomach Fluid. — The importance of accurate tests for the presence of lactic acid in the various substances commonly found in the stomach contents, and the study of digestive disorders after modern methods, has given rise to a careful investigation of this subject by various chemists, and with the result that more accurate methods have been proposed than were formerly employed.

Boas (Munch Med. Och.) having found lactic acid present in carcinoma of the stomach in using Uffelmann's reagent, contrary to previous observations, sought a more exact test. As is known to all chemists, lactic acid, when heated slowly in the presence of oxydizing agents, splits up into acetic aldehide and formic acid. The former substance is easily discovered and estimated quantitatively by various reagents, one of the most useful of which is the iodoform test. A given quantity of aldehide consumes a given quantity of iodine, and this gives a measure for the amount of lactic acid present.

In preparation for the test, the lactic acid is abstracted by ether. The test breakfast employed by Boas consists of gruel without salt. According to his observations, no lactic acid is to be found in any stage of healthy digestion, not even when free acid is absent. It is also absent in gastric catarrh, atony, and neurosis. In cases of the retention of the gastric contents, the stomach should be emptied the night previous to the test breakfast. Lactic acid was also found in cases of non-malignant strictures of the pylorus. Lactic acid was found in twenty-one cases of cancer of the stomach, and free hydrochloric acid was absent. The author believes the presence of lactic acid in cancer to be of diagnostic value, yet he does not consider its absence proof that cancer is not preseut.

The observations of the writer differ somewhat from those of Dr. Boas, as free hydrochloric acid has sometimes been found in cases of malignant diseases of the stomach. Golding-Bird, who was one of the first to make exact estimations of the amount of free hydrochloric acid found in the stomach fluid in cases of cancer of the stomach, also observed the presence of free hydrochloric acid.

J. H. K.

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Glandular Physiology. — Carvallo and Pachon (*Archives de Physiologie*) have recently completed a series of experiments, the purpose of which was to determine the digestive power of the pancreas in a fasting animal. Their experiments show that the pancreas of both normal animals and animals deprived of the spleen, always contains a substance capable of digesting fibrin, which may be separated from the gland by maceration in glycerine. The substance was determined to be the well-known tryptic ferment. Similar experiments showed the same to be true of the stomach and the peptic ferment.

Experiments made by Dastre and reported in the same journal, show that the proteolytic ferment is present, while the amylolytic is destroyed by inanition.

Creasote in Latent Tuberculosis.— Dr. Blanchard, of Geneva, recently reported the results in seventeen cases of latent tuberculosis. All the patients made a rapid and complete recovery. The symptoms were cough, with or without muco-purulent expectoration, emaciation, dyspnœa, general weakness, diarrhœa, and night sweats. The creasote was administered in an emulsion consisting of sweet oil of almonds, the beaten yolk of an egg, and ten ounces of water. The dose was, at the beginning, 4 minims, being gradually increased to 30 minims. When the dose exceeded 15 minims, it was divided, and administered in two or three enemata. The conclusions to which Dr. Blanchard arrives are as follows:—

1. Pulmonary tuberculosis is curable.
2. Creasote is a valuable remedy, especially in incipient cases.
3. It is important that the diagnosis should be made early, to give this mode of treatment a fair chance.
4. The remedy is also valuable in cases of bronchial catarrh, following influenza, which are regarded by Dr. Blanchard as cases of incipient phthisis.

No unpleasant symptoms followed the use of this drug when properly used.

The writer has for several years made extensive use of creasote in the treatment of tuberculosis, and with excellent results. In a case examined about six months ago, the disease had advanced to a stage of extensive consolidation of the upper portion of the right lung. Several hemorrhages had occurred; night sweats had occurred; the patient was extremely weak and ænemic. Creasote was administered by enema in ten to twenty minim doses for several weeks. When seen a month ago, no trace of the former disease could be found. The patient was in excellent health.

In the use of creasote, the precaution should be taken to examine the urine frequently by the chloride of iron test, and to note the occurrence of a smoky appearance. In cases in which the urine becomes smoky, the remedy should be administered only on alternate days.

J. H. K.

Save the Pieces.— Dr. Phinney recently reported at the Clinical Association, Md., a case in which a finger amputated at the last joint by accident was replaced seven hours after the accident, and grew fast. Sensation returned perfectly, and a slight motion of the joint was secured. No especial care was taken of the amputated fragment, except to wrap it up. On replacing the stump, it was carefully washed in warm water with antiseptics. A thin slice was taken off the raw surface and the injured end of the finger was treated in the same way. The part was secured in position by four sutures, and covered with gauze and collodion.

Modern Treatment of Gonorrhœa.—Prof. Neisser, of Breslau, in a recent paper asserts that all treatment of gonorrhœa should be based upon the recognition of the gonococcus as the essential cause of this disease. Astringent remedies are useless, as they do not destroy the gonococcus. The most valueable remedies are solutions of nitrate of silver in proportion of 1-4000 to 1-2000, and corrosive sublimate, 1-30,000 to 1-20,000. Cleanse the parts, first with boiled distilled water; then apply the lotion. The medicated lotion should never be strong enough to produce an increase of inflammation.

Visceral Disorders and the Menstrual Function. — A writer in *Clinique des Hopitaux* calls attention to the fact that visceral affections connected with menstrual disturbances are usually of a

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congestive type. He cites congestion of the mammary and thyroid glands in evidence of this, and suggests that morbid growths in these structures may have this congestion for their origin. He has also observed congestive disturbance, icterus, and a febrile state resembling the beginning of typhoid connected with catamenia. Transitory albuminuria and the swelling of the floating kidney at the menstrual period, were illustrations of the relation of the menstrual functions to the renal organs. Cystitis recurring at the menstrual period is a not uncommon condition.

The author seems not to have discovered that a sufficient explanation of the phenomenon to which he calls attention is to be found in the relation which the various viscera of the pelvis and abdomen sustain to the sympathetic nervous system, and through it to each other. A full understanding of the relation of the abdominal sympathetic to the internal organs of the trunk, enables us to understand and explain a great number of disorders which affect this region of the body.

J. H. K.

Modern Treatment of Uterine Myomata.— In a recent discussion of this subject at the Academy of Medicine at New York, a variety of opinions were expressed by different writers; those which impress us as being the most sound, are as follows: —

1. Galvanism is a valuable means of relieving the symptoms commonly present in this disease, especially pain and hemorrhage, and sometimes diminishes the size of the growth. It is especially applicable to small growths in young women and growths in women approaching the menopause.

2. Removal of the appendages is a satisfactory method in growths of moderate size and those of the hard, multilovulor variety. The operation is less successful in the softer growths, and is not to be relied upon in cases of soft œdematous myoma.

3. Galvanism and curettage may generally be relied upon for the relief of hemorrhage.

4. Hysterectomy is the proper procedure in refractory cases, and in skilled hands the operation is much less dangerous than was formerly supposed, and may be performed with nearly as great safety as ovariotomy.

Hydrotherapy for Chronic Joint Disease.— For many years the writer has made successful use of hydrotherapy in the treatment of chronic joint disease, chronic rheumatism, and chronic inflammation of individual joints. A simple method which is very effective, is the hot and cold pour; the joint is held over a tub, and hot and cold water are alternately poured over it. The extremes of temperature should be made as great as the patient can bear without inconvenience. The treatment should continue for twenty or thirty minutes, and be applied once or twice daily. After the treatment, the limbs should be wrapped in a coarse cloth wrung as dry as possible out of cold water. Outside of the damp cloth, a dry wrapping should be applied, and oil muslin outside of all; the covering should be thick, so that quick and thorough reaction will occur. This method, combined with massage and local applications of electricity, will secure recovery in a great majority of cases, while without such effective means no improvement could be obtained. Medication is of extremely little use in these cases. The same must be said of liniments of all sorts commonly considered valuable, but now almost wholly abandoned.

Thyroidectomy in Graves's Disease.— Dr. J. J. Putnam recommends thyroidectomy as a valuable means of controlling Graves's disease. In forty reported cases, two deaths occurred. Profound temporary weakness and laryngeal paresis is likely to occur.

Curettage for Chronic Granular Ophthalmia.— Dr. Peters, an eminent German specialist, recommends as the most successful method of treating granular condition of the conjúnctiva, scraping the affected surface with a sharp-edged instrument, while the patient is under the influence of cocaine. Marked improvement is found to occur as the result of a single application. The writer employed this method at the suggestion of another, more than twelve years ago, and has often repeated it since with good results.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Staphylococcus Aureus in Fishes. — Dr. Charrin reported, at a recent meeting of the Biological Society of Paris, the result of the study of an epidemic among fishes in the Rhone. A large number of dead and dying fishes belonging to the gudgeon species were found lying in the Rhone, and on examination, the anterior third of the body was found affected by œdematous infiltration. A small quantity of fluid was found in the abdominal cavity, and the muscles were in a state of tonic spasm. Cultures made on gelatin and broth exhibited the staphylococcus aureus. Healthy fishes inoculated with the culture became sick in the same manner. This observation is very interesting, as showing that the pus-producing microbe found is capable of developing under widely different conditions, and also suggests the means of septic infection, which seems to have escaped attention heretofore.

Influence of Iodoform upon Pus Germs.— Recent experiments by Maurel (*Bulletin Generale de Therapeutique*) show that virulent pus germs will destroy leucocytes in two hours, under conditions in which the cells would live from twelve to twenty-four hours. The death of the leucocytes he finds to be due to toxines contained within the bodies of the microbes, and not to toxic products thrown off by germs, or to their mechanical action. Red corpuscles are rendered diffluent in fifteen hours, and then break up.

Another series of experiments showed that iodoform is not toxic to the white corpuscles when added to the blood in the proportion of one part of iodoform to 400 of blood; in fact, the activity of the leucocytes was increased. There was no action whatever in the red cells. The action of iodoform upon the staphylococcus was to attenuate its virulence when added to a mixture of micrococci and leucocytes. The leucocytes survived four times as long without the iodoform, or eight hours. The leucocytes readily devour the staphylococci when iodoform is not present, but are killed by the toxic elements contained in the bodies of the leucocytes. When iodoform is added, the toxic properties of the microbes are in some way modified so that they are devoured by the leucocytes with impunity. Iodoform has no influence upon the reproductive powers of the staphylococcus. Suppuration is simply a process in which great numbers of leucocytes succumb to the action of the toxic products of certain germs. Iodoform antagonizes suppuration by increasing the activity of the leucocytes and attenuating the virulence of the microbes.

Relation of Tuberculin to the Blood-cells. — Dr. Edward Maurel, as the result of recent experiments (*Midi Medical*) finds that tuberculin, in the doses in which it is already employed therapeutically, has no sensible effect upon either white or red blood-cells. His experiments also show that human leucocytes are able to resist successfully the bacillus tuberculosis, and that it is only necessary to attenuate the bacillus to a slight degree to enable the leucocytes to destroy the microbe. The experimenter suggests that it is only necessary to discover some agent capable of doing this, to cure one of the most dreadful maladies with which the human race is afflicted.

Quarantine in Cases of Rötheln.— Dr. Sevestre, of Paris, in describing an epidemic of rötheln which recently occurred in that city, states that the students were permitted to resume class work at the end of seven to twelve days after the beginning of the attack, and that not a single case of contagion occurred after the first outbreak. This period is shorter than has heretofore been considered necessary, twenty days having been regarded as not too great a time to enable the patient to become entirely rid of this disease. Dr. Sevestre suggests that since this disease, like measles, is contagious from the very beginning of the outbreak, the proper method of procedure is to quarantine, under careful observation, all who have been exposed to the danger of infection, from the twelfth day until sufficient time has elapsed for the incubation to be complete, which is fourteen to fifteen days. It is probably not necessary that the patient should be quarantined more than four to six days.

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PROLAPSED COLON.

THE valuable articles by Dr. Meinert, which we have had the pleasure of presenting to our readers, deal with a very important practical subject which has heretofore received far too little attention. Indeed, in this country, the morbid conditions which Glenard and Trastour have grouped under the general term enteroptosis, have been almost altogether ignored. The outline tracings of the human figure, and accompanying statistics presented by the writer at the last Washington meeting of the American Medical Association, and a paper with similar illustrated facts, at the annual meeting of the American Association of Obstetricians and Gynecologists, September, 1890, were, so far as we know, almost the only presentations of this subject in the English language, previous to the publication of the recent paper by Dr. Meinert, which the author prepared, at our request, especially for publication in this journal.

After several years' study of this subject from our own standpoint, and careful comparison of our results with those obtained by European investigators, we feel convinced that this matter is one which requires the careful consideration of every medical man who wishes to practice medicine in accordance with rational principles. The educated physician of the present time does not confine himself to doses, and does not apply his remedies empirically, but stands upon the broad foundation afforded by modern physiological and pathological research, and is able to give the reason for his medical faith and medical practice.

We are confident that no one pathological condition figures more largely in the causation of a vast number of nervous symptoms, which, grouped in various ways, are treated as primary diseases, than does the disturbance of the sympathetic nervous system resulting from displacement of the right kidney, the stomach, the colon, and other abdominal viscera. The prolapse of these organs puts under strain the filaments of the abdominal sympathetic which supplies them, and the irritation transmitted from these strains, and hyper-sensitive branches, brings the whole sympathetic into a morbid condition, and through it, the spine and cerebrum become in like manner affected.

Gastric neurasthenia is, unquestionably, chiefly dependent on morbid conditions growing out of dilatation of the stomach and prolapse of the abdominal viscera. Probably nine tenths of the cases of insomnia find in this morbid condition the efficient cause which maintains the morbid nervous state, in spite of all the hypnotics which can be employed. Migraine, or nervous headache, and the great variety of neurotic symptoms so frequently observed, especially in women, may be traced, in a great majority of cases, to the same cause.

Those who have not made a careful study of this subject will doubtless be more or less skeptical in relation to it. It is indeed almost impossible for one to credit his own observations in some cases, so extraordinary are the conditions of displacement which are occasionally met. But the methods of diagnosis of the morbid conditions relating to the abdominal viscera have, within recent years, been so perfected as to enable us to pursue

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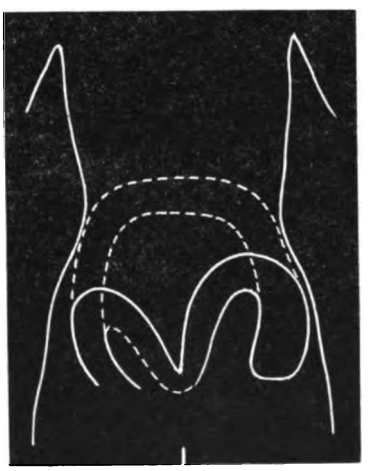
our investigations in relation to these organs with the same degree of precision and scientific exactness as in the physical diagnosis of the organs of digestion.

Abdominal surgeons have an excellent opportunity to bring the correctness of such observations as those which have been reported by Dr. Meinert. Recently the writer observed a case which is worthy of mention: In making an abdominal section for the removal of diseased appendages in a case of double pyosalpinx, the colon was found prolapsed to such a degree that the middle of the transverse colon lay in contact



with the lower portion of the sigmoid flexure. The condition of the colon was that outlined in the accompanying figure. We, of course, improved the opportunity of restoring the colon as nearly as possible to its normal state, and with it, the prolapsed stomach which had been dragged down by it so that the lower border of the stomach was found several inches below the umbilicus. This condition of the colon often gives rise to symptoms which lead to the suspicion of stricture in the bowel. No organic stricture exists, but a pseudo-stricture which has resulted from the folding of the gut.

It is to be hoped that American teachers of clinical medicine will more generally acquaint themselves with the facts which are now known in relation to this important subject, so that the rising generation of doctors may start out with a better understanding of how best to deal with otherwise puzzling and complicated cases in which the various degrees and varieties of enteroptosis are now known to play the chief role as regards causation.

J. H. K.

RATIONAL REST-CURE.

SINCE the publication, some years ago, of Dr. Mitchell's little work, "Fat and Blood," the "rest-cure" plan of treating various classes of chronic invalids, particularly women suffering from neurasthenia, has greatly grown in favor, until at the present time there is probably no one routine plan of treatment so frequently adopted as this. But the results are too often disappointing. The writer sees, every year, scores of women and occasionally men who have been subjected to the so-called "rest-cure" method of treatment for weeks, or even months, without benefit. In some instances patients have found themselves at the end of a long course of rest-cure treatment worse than at the beginning. The reasons for a failure differ in different cases. Those which we have most frequently observed are,—

1. Neglect to recognize the essential cause of the malady. In many cases this has been found to be dilatation of the stomach, a sacculated stomach, disturbed condition of the abdominal sympathetic, prolapsed bowels, a floating kidney, generally a result of the weakening of the abdominal walls, bad postures in sitting or standing, and the wearing of tight clothing. Errors in diet and various hygienic neglects are causes which are also frequently overlooked.

2. Neglect to subject the patient, after the prolonged rest in bed, to a systematic

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course of exercise for developing muscular vigor and symmetry.

The mentioned cause of failure, when thoroughly understood, brings into clear light the weak point of the "rest-cure" method. "Rest-cure" is essential in a variety of cases, up to a certain point, but after that "work-cure" is as essential to a complete and permanent recovery as was "rest-cure" at the beginning of the case. At the end of a course of so-called "rest-cure," the patient is often in a weaker condition muscularly than at the beginning. This is the natural result of the prolonged rest in bed. To leave a patient in this condition is to subject him, almost inevitably, to a relapse. The patient is never permanently recovered until he is able to remain well, not only under the favorable condition of a suitable environment and skillful treatment, but under unfavorable conditions, and to endure small emergencies and moderate hardships. There are some patients who can never be recovered to this extent, and who can only be well under the most favorable conditions which they can command; but this is not true of all. Many, by a proper course of treatment and training, may develop a degree of strength and vigor which will ensure to them enjoyment of good health with reasonable care.

The patient who has been subjected to a "rest-cure" must, when the proper time arrives, begin a course of systematic gymnastics, beginning with massage. The massage must be supplemented by Swedish gymnastics, and later by bed gymnastics, chair gymnastics, breathing exercises, Swedish educational gymnastics, etc. A carefully graduated scheme of exercise must be pursued, the same being carefully adapted to each individual case. The "rest-cure" patient is not well until he is well established on his feet, and has become able to engage in the ordinary duties of life without a return of his disorder. It is exceedingly difficult to carry out a systematic course of treatment of this sort in an ordinary home. Those patients who require "rest-cure" treatment need, as a rule, to be taken away from their home surroundings, and subjected to the regimen of a well-managed Sanitarium.

A Modern Samson.—Strong and enduring men are doubtless much less numerous now-a-days than in the days of the ancient Greeks, when all men and women were required to undergo a course of physical training as a part of their education. Indeed, it is probable that very strong and vigorous men are even less numerous at the present day than a hundred years ago. Our modern civilization is responsible for very marked and rapid deterioration in physical stamina. This fact was well illustrated by a fact pointed out to Chief Justice Coleridge by a United States Senator when the former was on a visit to this country, some years ago. The senator was showing the Chief Justice the place at which George Washington accomplished the feat of throwing a silver dollar to a distance so great that the Chief Justice was quite astounded, and exclaimed, "How did he do it?" The senator replied, "A dollar went farther in those days than now,"— a very truthful remark, indeed. Not only dollars, but muscles, were possessed of a higher value a century ago than at the present day. The Father of his Country, though not a trained athlete, covered in a long jump the space of twenty-four feet; whereas Frazer, the world's champion jumper at the present time, has never been able to exceed the distance of twenty-three feet.

Occasionally, however, a man is found whose strength and development so nearly approach the standard of the olden times, and so far exceed that of the present, that he is considered a curiosity, almost a freak of nature, and he is carried about from city to city to be exhibited in museums, and in special

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shows, to the astonishment of all beholders. A man of this sort, who might well be called a modern Samson, was exhibited during last summer in New York. A similar exhibition was also made in Chicago. Some of the measurements of this man's strength may be of interest. The following are some of the more important: —

Neck, 18½ inches; biceps, 19½ inches; forearm, 17 inches; chest, normal, 52 inches; after exhalation, 46 inches; when fully expanded, 58 inches; waist, 29 inches; thigh, 26¾ inches; calf, 18 inches; height, 5 ft. 8½ inches; weight, 199 lbs.

The most remarkable of all these figures are the chest measurements. The average man of 5 ft. 8 in. has a chest measurement of only 34 in. The measurement of the chest in professional athletes rarely exceeds 40 in., a whole foot less than that of this modern Samson. The chest expansion is also phenomenal. Seven inches is the greatest waist expansion which has ever been noted by the writer, while in this man it reached twelve inches — a foot.

If physical exercise of the right sort were enforced in all our public schools, scarcely a generation would be required to develop a race of strong men. The total lifting capacity of the entire body, as shown by the researches of the writer, is but little less than ten thousand pounds in a strong man, and is slightly more than five thousand pounds in the average man.

The capacity of the body for muscular work is far greater than is generally supposed. It is only necessary that the muscles should be developed to their full capacity, and that there should be a symmetrical development of the whole muscular system, to enable a well-organized human being to exhibit an amount of muscular energy, which, to the uninitiated, would be truly astonishing.

J. H. K.

REVIEWS.

Results of Aseptic Celiotomy.— By Wm. H. Wathen, A. M., M. D., Louisville, Ky.

This little paper by Prof. Wathen is an admirably concise and complete presentation of the technique of aseptic work in abdominal surgery. In reading the paper carefully through, we find not a word with which we cannot heartily agree, and scarcely an opportunity to add a word upon any point. We have only to add a single word in relation to the preparation of the paper. In some cases the writer has found it advantageous to employ lavage of the stomach, and copious coloclysters for the purpose of completely emptying the alimentary canal. These measures are often essential, even when laxatives are freely used, to get rid of fecal masses and residual matter in dilated or sacculated stomachs. In connection with these measures, an aseptic diet is employed for some days prior to the operation, as well as after it. With the great attention given to asepsis and technique by Dr. Wathen, it is not a matter of surprise that his results are so eminently satisfactory.

Simple and Practical Methods in Dress Reform.— By Robert L. Dickinson, M. D., Brooklyn, N. Y.

This is an admirable paper written by a man of experience and research. Dr. Dickinson has devoted many years to the careful study of the influence of dress in producing deformity and disease of the body. He has made exhaustive researches in this direction, by which he has added many valuable facts to our knowledge of this question. The present paper is an attempt to solve the practical problem of how a woman may reform her dress. The paper is one which every practitioner ought to read, and it would be well if every gynecologist would keep

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a few copies of this paper in his office to hand to his lady patients, as it gives just the practical information which every intelligent woman needs to aid her in making the radical reform in her mode of dress which, in the majority of cases, is necessary for a cure of pelvic disease.

Exercise for Pulmonary Invalids. — By Charles Denison, A. M., M. D., Denver, Colo.

This is an excellent little monogram, by a practical man. It contains practical directions about exercise which may be easily followed by any person of ordinary intelligence and who is really in earnest about getting well, and willing to work out his own salvation. The chief criticism we have to make, is, in the reproduction by the author, of two cuts from Checkley's work, the first of which is supposed to represent the correct standing position, but which, in our opinion, is decidedly incorrect. Among the cuts contained in the work, is one illustrating a manometer for testing the strength of the lungs, which seems to be a reproduction of Waldenburg's pneumatometer. Another cut shows Dr. Denison's spirometer, a simple and convenient instrument for measuring lung capacity, and taking certain forms of lung gymnastics. Dr. Denison has done more than any other man to bring to the attention of the public the hygienic value of the climate of Colorado and adjacent States, and is deservedly as popular at home as abroad.

The History, Present Status, and Future Progress of Medicine. — By N. S. Davis, A. M., M. D., LL. D., Chicago, Ill.

The subject matter of this paper constituted a lecture at the Post-Graduate Medical School and Hospital in Chicago, delivered Sept. 1, 1893. It is an admirable presentation, in Dr. Davis's inimitable style of presenting the subject indicated above. After calling attention to the unmerous and now exploded theories which have at various times been accepted as a part and parcel of pathological science, Dr. Davis says, "The pathology of the present day is no less in need of patient and scrutinizing review, with the aid of the most exact methods of research." The high standard which Dr. Davis places before his pupils is well shown in the following sentence: "It should be the aim of every practitioner of the healing art, to know the actual changes in the blood, the tissues, the secretions and excretions, and the functions of each organ, from the beginning to the end of every morbid process or disease he treats." It is a privilege which any student of medicine ought to appreciate, to sit at the feet of such a teacher as Dr. Davis, and a large part of the medical profession of this country might occupy such a position without doing themselves injustice, and with immense professional profit.

The Primary Action of the Galvanic Current. — By J. Mount Bleyer, M. D., and M. Milton Weill, M. D., New York City.

The authors of this paper have made a very exhaustive study of the influence of the galvanic current upon the chemical composition of the blood, and claim to have demonstrated that the influence of galvanic electricity upon the blood is to increase the amount of ozone which it contains. They also present an original theory relating to animal electricity. The authors will doubtless find many who will disagree with them, but such investigations are always of interest, and worthy of careful study.

Report on Nasal Surgery. — By M. F. Coomes, A. M., M. D., Louisville, Ky.

This paper is illustrated by many interesting cases, the successful treatment of which demonstrates the author's skill in the treatment of physical deformities.

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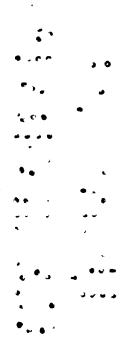

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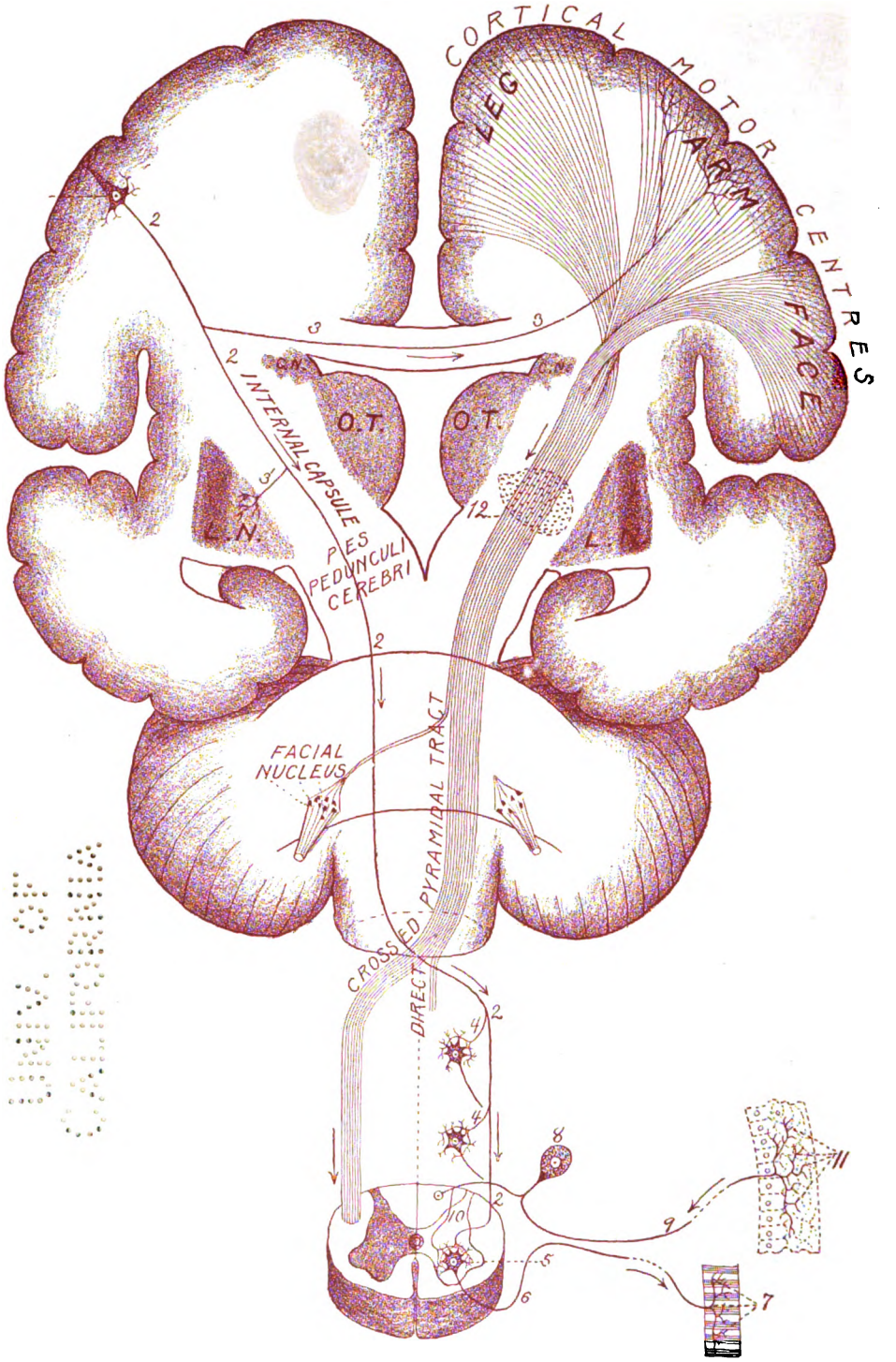

DIAGRAM ILLUSTRATING THE MOTOR AREA AND THE MOTOR TRACT. By W. H. Riley, M. D.

O. T. Optic Thalamus; L. N. Lenticular Nucleus; C. N. Candato Nucleus; 1. Cortical motor cell; 2, 2, 2, 2, 2. Axis cylinder process of motor cell ending in end brush around the spinal cell at 5; 3, 3. Collateral branch to opposite hemisphere; 3'. Collateral branch to lenticular nucleus; 4, 4. Collateral branches to spinal motor cells; 5. Spinal motor cell; 6. Spinal motor nerve; 7. End brush of same; 8. Cell in posterior spinal ganglia; 9. Afferent nerve from skin; 10. Collateral branch of central branch of afferent nerve; 11. End brush of afferent nerve.

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MODERN MEDICINE
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ORIGINAL ARTICLES.

THE VOLUNTARY MOTOR MECHANISM AND SOME OF ITS DISEASES,—MOTOR PARALYSIS, WITH ILLUSTRATIVE CASES.

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WHEN we direct our attention to our own body, we recognize certain of our movements as "voluntary," and we say that they are executed by an effort of the "will." Some of our maneuvers may be complex and intricate, and such as can be learned only in time and by practice under the direction of an intelligent volition. The movements of the hands and fingers in playing musical instruments, and the various dextrous movements necessary to the plying of many of the industrial arts, are examples of these, and may be justly styled skilled movements.

Again, some of our movements are simple in character, such as may be brought under the control of the "will" without much practice. They are the first movements learned by the child; they are common to all, and may be illustrated by the movements of the face and the eyes, by simple movements of the limbs, as walking, etc. These may be termed fundamental movements in opposition to acquired movements, or those which are not common to all, and which are accomplished only by much practice.

All of our movements, which are not properly reflex or automatic in character, come under the head of voluntary movements. Sometime in the life of the individual these movements must be learned. The disposition to acquire some, such as walking, may be inherited; nevertheless the child must learn to walk. In more difficult movements, such as playing a musical instrument, there is no element of inheritance that is common to all. Here the movements must be learned without the help of heredity.

For the sake of distinction, then, voluntary movements may be divided into two classes:—

1. Primary — those for which we have an inherited predisposition.

2. Secondary — those which are wholly acquired.

All the different parts concerned in the development of voluntary movements taken together, make up what we may term the voluntary motor mechanism. In this mechanism the muscle is but a link in the chain, of which there are many parts. This mechanism, as related to its center, the motor area of the brain, may be said to have two general divisions: one concerned in carrying impulses inward, and hence afferent in its functions; the other concerned in originating nervous impulses, and carrying them outward, and hence efferent in its functions.

In the present paper we shall deal principally with the efferent side of the motor mechanism, and shall leave for consideration elsewhere those parts of the nervous system which have to do with carrying nervous impulses from muscles, joints, skin, etc., inward to the brain, by means of which the motor cortex of the brain, which has to do with sending nervous impulses outward to the muscles, may be kept informed of the positions of the various parts of the body, the relation of distant parts to each other, and of the body as a whole to its environments. The afferent part of our motor mechanism, then, really has nothing to do with originating those nervous impulses which give rise to muscular contraction. The effer-

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ent part, on the other hand, is concerned in originating nervous impulses, conducting them along certain paths to the muscles, where they bring about those changes in the muscles which result in motion. A destructive lesion in any of its parts always produces a partial or complete loss of motion, which we term paresis, or paralysis.

Leaving the efferent side out of the question for the purpose of this paper, we may regard the motor mechanism as made up of the following elements:—

1. A cortical motor cell.
2. The axis cylinder process of the cortical motor cell.
3. A spinal motor cell.
4. The axis cylinder process of the spinal motor cell.
5. The muscle.

That part of the cortex of the brain where the cortical motor cells are grouped together, we call the motor area. The cortical motor cell, with its axis cylinder process, which becomes a nerve fiber, forms the upper segment of the motor path. The spinal motor cell and its axis cylinder process, which also becomes a nerve fiber with a myelin sheath and neurilemma, form the lower segment of the motor path. The motor path, then, in its entirety, includes these two segments, and is the complete line over which an efferent, or outgoing, nervous impulse travels from the cortex of the brain to the muscle. (See frontispiece, 1, 2, 2, 2, 2, and 2 form the upper segment of the motor path; 5, 6, and 7 the lower.)

THE MOTOR AREA.

In 1870, Fritz and Hitzig, two German investigators, produced coördinated movements in the limbs, face, and neck of dogs, when certain parts of the cortex of the brain were stimulated with weak currents of electricity; and, curious as it then seemed, these movements were always on the side of the body opposite to the part of the brain stimulated. These investigators found that while stimulating certain parts of the cerebral cortex with an electrical current produced muscular contractions, stimulating other parts gave negative results. They went still further, and demonstrated that within that part of the cortical area which responded to electrical stimulation, there were certain centers, the stimulation of which was always followed by definite coördinated movements in certain parts of the body, which seemed to be related to the cortical area stimulated.

The experiments of Fritz and Hitzig marked the beginning of a new epoch in the field of experimental physiology, and opened the way for our present knowledge of localization of brain function.

We cannot here enter into a discussion of the various steps and methods which have led up to our present knowledge of this subject, but, without going into detail, the main facts of our knowledge of the motor area at the present date, are as follows:—

1. The motor area is that part of the cerebral cortex in which originate those efferent nervous impulses which give rise to voluntary movements. (We must not conclude that this part of the brain subserves no other function than that of motion. There is reason for believing that it has sensory as well as motor functions, and hence is sometimes called the sensori-motor area.)

2. It occupies a part of both the external and the internal surfaces of each hemisphere. On the external surface it is made up of the ascending frontal and ascending parietal convolutions, which are separated by the fissure of Rolando, the greater part of the superior parietal, and possibly the base of the superior frontal convolution. On the internal surface, it occupies the paracentral lobule, which is a continuation of the ascending frontal and ascending parietal convolutions on the median surface of each hemisphere, lying in front of the upturned end of the collosso-marginal fissure.

It has been demonstrated by Shäfer, Horsley, and Beevor, that the motor area in the monkey, besides including the above, also takes in the base of the three frontal convolutions, and all of the superior parietal lobule. And it is very probable that the motor area of man extends over quite as wide an area; but there are some centers, particularly those for the conjugate movements of the head and eyes, which are located at the base of the three frontal convolutions in the monkey, that have not yet been positively proven to be present in the brain of man, by actual demonstration.

The centers for the various movements of different parts of the body have been carefully located in the monkey's brain by Shäfer, Horsley, and others. Corre-

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sponding centers have for the most part been demonstrated in the brain of man by surgical operations and post-mortem examinations. Those centers adjacent to the longitudinal fissure extend over on the paracentral lobule on the median surface of the hemisphere, and here occupy the same relative position as they do on the external surface. The relative position of the face, arm, and leg centers, with the pyramidal fibers arising from them, is shown in the frontispiece.

3. In the lower animals, as the rabbit, dog, and monkey, the limits of these different centers are not bounded by sharp and well-defined lines, but the different centers blend one into another. The dividing line is more sharply drawn in the dog than in the rabbit, still more in the monkey; and although the opportunities for stimulating these different centers in the brain of man have been comparatively few, the results obtained lead us to conclude that the differentiation is even greater than in the monkey.

4. Movements, and not parts of the body, are represented in the motor area. Any part of the body which is capable of performing a great variety of movements, occupies a comparatively larger part of the motor area than some other part of the body which can perform but few movements.

5. These different centers are capable of electrical stimulation, either by an interrupted constant current, or by the induced current. Stimulations of the different centers are followed by movements on the opposite side of the body, which are represented in the center stimulated.

6. Those muscles which usually or always act together, as the muscles of the eyes, face, and larynx, the muscles of mastication, the respiratory muscles, and some of the muscles of the trunk, have a bilateral representation in the brain; *i. e.*, they have a center in each hemisphere. In cases of hemiplegia, in which the influence of the motor centers of one hemisphere are cut off from the muscles on the opposite side of the body, by a lesion in some part of the pyramidal tract, these muscles are slightly or not at all affected; for when they are separated from one center by disease, the center in the other hemisphere of the brain is left in charge of their movements.

7. Irritating lesions in any of these centers cause spasm or convulsions in those parts on the opposite side of the body that are related to the centers irritated. The irritation may be communicated to adjacent centers, and general convulsions follow. Destructive lesions cause paralysis in corresponding parts.

8. The evidences of the above facts have been obtained principally by experimentation on the cortex of the brain of the lower animals, and by clinical observation of disease, followed by post-mortem examination, or surgical procedure, in man. The pathological evidence is the most demonstrative.

Prominent among the many investigators of this subject may be mentioned Fritz, Hitzig, Ferrier, Munk, Shäfer, Horsley, Exner, Nothnagle, Beevor, Golotz, Luciani, and many others.

THE CORTICAL MOTOR CELLS.

Our conception of the nerve cell, and the anatomical relations existing between it and nerve processes, has been very much modified and broadened during the past two or three years, by the examination of the minute anatomy of the central nervous system by the staining method of Golgi, of Pavia, whose work has been confirmed and extended by S. Raymon y Cajal, of Barcelona, and by Kölliker; by the embryological investigations of His; by the comparative and histological observations of Retzius, Nansen, and Biederman; by the method of studying degenerated nerve fiber as introduced by Marchi; by the method of staining intravitam by methyl-blue, originated by Erlich; and by the course taken by "action currents," as demonstrated by Gotch and Horsley with the electrometer, and by the labors of many others.

In the present paper we can only refer to the results obtained along these various lines of investigation in so far as they are related to the motor cells and their processes.

In the cortex, or grey matter, of the brain, are found nerve cells with their various processes. These cells are grouped together in layers from the surface downward, each of the different layers being characterized by cells which are different in shape and size from all the others. There can usually be demonstrated five distinct layers of cells. The shape and size of the cells in the first

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three layers next to the surface, and in the last next to the white substance, are about the same in all parts of the cortex, but in the fourth layer in the motor area

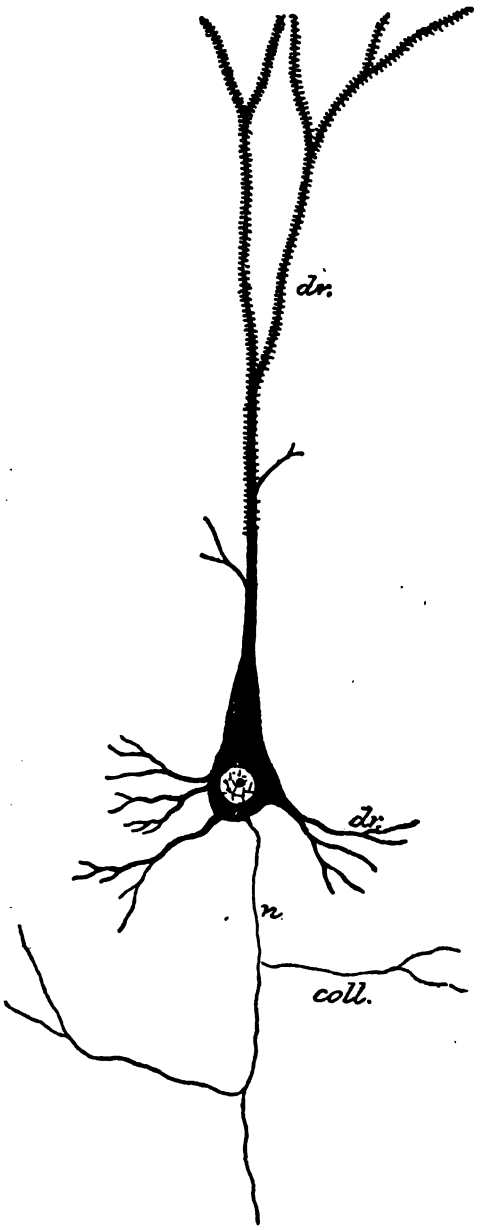

FIG. 1.— A projection-cell of the Cerebral Cortex after Shäfer, *dr*, dendrons; *n*, neuron; *coll.* collaterals.

are found large, triangular, and irregular cells, the giant cells of Betz. These cells are not found in any other part of the cortex. In size and shape they resemble very closely the large motor cells in the spinal cord. These facts make it highly probable that they are motor in function. (Clinical observation would lead us to suppose that some of the cells in the motor area are sensory in function. If so, they are probably some of the cells of the other layers.)

In the light of modern research, the cortical motor cell, with all its parts, as well as every other nerve cell, is a distinct and isolated anatomical nerve unit. To this nerve unit Waldeyer has given the name of *neuron*. Shäfer prefers to regard this nerve unit as simply the *nerve cell* (which seems to us to be the most natural), and applies the term *neuron* to the axis cylinder process of the cell.

The motor cell of the cortex, then, may be considered as made up of two parts, the cell body and the cell processes. The processes are of two kinds: 1. The protoplasmic processes of Deiters, or dendrites (His), or dendrons (Shäfer); 2. The axis cylinder process, or neuron, of Shäfer. (See Fig. 1; also frontispiece, 1 and 2.)

The body of the cell is large, irregular, triangular, or pyramidal in shape, with the apex pointing upward. It has a large nucleus and a large nucleolus. There is a reticulum in the protoplasm of the cell, and an intranuclear network. From the apex of the cell passes upward for some distance a protoplasmic process, or dendron, which divides and subdivides near its terminus into smaller branches. There are also protoplasmic processes arising from the base of the cell, which extend out laterally. The axis cylinder process, or neuron of Shäfer, starts from the base of the cell, takes on a medullary sheath, and extends for a long distance downward. It is the efferent or projection fiber of the cortical motor cell. In its course downward it sends out various branches, to which Cajal has given the name of collaterals. One of these (3, in frontispiece) passes through the corpus callosum to the other hemisphere of the brain, where it divides into fine branches, which end around the motor cells on the opposite side of the brain. By this branch an association is formed between corresponding centers in the two cerebral hemispheres. Mott and Shäfer have shown experimentally in the monkey that when the corpus callosum was stimulated with weak currents of electricity, bilateral movements of the head, trunk, and limbs were obtained. When one hemisphere of

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the brain was destroyed, the movements were on one side only, and those on the opposite side to the one in which the hemisphere was intact. That is, when the left hemisphere was removed, and the cut ends of the fibers of the corpus callosum stimulated, the movements were confined to the left side of the body.

These experiments show that the corpus callosum contains fibers that are associated with the motor centers in both hemispheres. We have good reason for believing that this association is obtained through collateral branches, as shown at 3, in frontispiece.

After giving off a collateral branch, 3, as just described, the axis cylinder process passes through the internal capsule, where it gives off other collateral branches to the corpus striatum. One of these is shown in frontispiece, as 3'. Just what function is subserved by this relation we do not know. In fact, it is only very recently that it has been demonstrated that such a relation exists.

Our knowledge of the function of the corpus striatum, except what is known negatively, is practically a blank. It may be completely destroyed by disease without producing any disturbance of motion or other symptoms. Clinically it is a latent region.

From the internal capsule the axis cylinder process of the cortical motor cell passes downward through the pes pedunculi cerebri, the pons, and the medulla. In the lower part of the medulla it crosses over to the other side, and extends downward in the lateral columns of the cord, giving off other collateral branches at 4 and 4, which divide into small branches and surround the spinal motor cells.

Passing onward, the main branch, after breaking up into a number of fine branches, the terminal end brush (*endbäumchen*, Kölliker), finally ends about a motor cell at 5, frontispiece.

By this arrangement a single cortical cell is put in physiological relation with several spinal cells, as well as with cells in other parts of the brain.

THE PYRAMIDAL TRACTS.

The axis cylinder processes of all the cortical motor cells, taken together, form a collection of fibers to which the name *pyramidal tracts* has been applied. The fibers which compose these tracts all arise from the motor cells within the motor area; and as the axis cylinder process is the efferent, or outgoing, path, along which nervous impulses travel from the motor cell toward the periphery of the body, so the pyramidal tract forms the outlet, or efferent tract, from the motor area. The pyramidal tracts sustain, then, the same relation to the motor area that a single axis cylinder process does to the motor cell from which it arises.

These fibers coming from the motor cells in the cortex, pass down through the white substance of the brain. In their downward course they converge together, and occupy the anterior two thirds of the posterior division of the internal capsule, between the optic thalamus on the inside, and the lenticular nucleus on the outside. The fibers from the face area pass inward, and occupy a position in the capsule anterior to the others. The fibers from the leg area hold a position posterior to the others in the capsule; while the fibers from the arm area pass through the capsule between those from the face area in front, and the leg area behind. (See frontispiece.) From the internal capsule the motor fibers pass into the crus, and here occupy the middle two fifths of the crusta, or pes, which is that part of the crus situated in front of the substantia nigra. From the crusta they pass into the pons. Here they lie between the superficial and the deep transverse fibers of the pons, where they are divided into bundles by the grey matter of the pons, with which, however, they have no connection. Below the pons they are gathered together again, occupying the anterior part of the medulla oblongata, forming here the pyramids of the medulla, from whence they obtain the name of pyramidal tracts. In the lower part of the medulla, eight tenths of these fibers cross over to the other side, and pass down the lateral columns of the cord, as the crossed pyramidal tracts, while the other two tenths pass down on the same side of the brain from whence they came, and hence are called the direct pyramidal tracts. The fibers of the direct pyramidal tracts, also cross over to the opposite side of the cord at different levels as they pass downward. Both the crossed and the direct pyramidal tracts are constantly diminishing in size from above downward, on account of giving off fibers to form a physiological connection with the motor cells in the anterior horns of the grey

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matter of the spinal cord, as described above.

The direct pyramidal tracts extend down the cord to about the middle dorsal region, while the crossed pyramidal tracts extend the whole length of the cord.

The following facts are demonstrative, that these pyramidal tracts form the efferent, or outgoing, path for nervous impulses arising in the motor area of the brain, which give rise to muscular contraction: —

1. When stimulated by weak currents of electricity, they give rise to definite coördinated movements on the opposite side of the body, identical with the movements produced by stimulating the corresponding centers in the motor area of the brain.

2. When they are severed from their connection with the cortical centers of the brain by an incision, in lower animals, or by disease, as is often noticed in the case of man, these pyramidal tracts undergo a degeneration, and this degeneration can be traced downward through the various parts of the brain into the spinal cord, and in fact through the whole length of the course of these fibers.

3. In the developing cord of the embryo, the fibers of the different tracts in the cord take their medullary sheaths at different periods. The direct and crossed pyramidal tracts do not take their medullary sheath until birth. By certain methods of staining the medullary sheaths of the other fibers in the cord, these pyramidal tracts can be distinctly traced throughout the cord and different parts of the brain to the motor cortex, as white bands of fibers, which, being unstained, can easily be distinguished from all the other fibers, which are colored by the staining process.

4. Gotch and Horsley have demonstrated with the electrometer that there are "currents of action" which pass along these tracts from the motor area, whenever this area is excited. These "currents of action" are accompaniments of nervous impulses which travel along the same path.

THE SPINAL MOTOR CELL.

The spinal motor cells are grouped together in different parts in the anterior horns of the grey matter of the cord. These different groups have received appropriate names.

The spinal motor cell, with all its processes, like the cortical motor cell with its processes, forms an isolated anatomical unit, which, according to Waldeyer, we may term a *neuron*, or with Shäfer, the nerve cell. For description it may be considered as made up of two parts: (1) the cell body; and (2) the cell processes. The cell processes are (*a*) the axis cylinder process (neuron, Shäfer), and (*b*) the protoplasmic processes (dendrons, Shäfer.)

The cell body is large and irregular, with one or more nuclei. The axis cylinder process passes out of the cord through the anterior root, and becomes a motor nerve fiber with a medullary sheath and a neurilemma, which finally divides into a number of fine branches, the end brush, which end in the muscle. (See frontispiece, 5, 6, and 7.) The protoplasmic processes consist of a number of branches which divide and subdivide, and help to form a network of fibers in the grey matter of the cord. They are supposed to act some part in the nutrition of the cell.

The anatomical and physiological relations of the two motor cells, cortical and spinal, need to be emphasized here in the light of recent research. It was formerly supposed that one nerve cell united with another by a relatively coarse fiber, but when it was shown by Gerlach and others that a union in this way did not obtain, it was still believed that a union was effected by a network of fibers which united, or anastomosed, directly one with another, and thus an anatomical connection was established.

We now know that these motor cells under consideration, as well as other nerve cells, each forms a distinct, isolated anatomical unit. The union of the cortical cell with the spinal cell is a physiological and not an anatomical one, and is brought about by the axis cylinder process of the cortical cell breaking up into fine branches, forming the end brush which surrounds the spinal motor cell, without passing into it, or being directly continuous with it. The two elements are simply in contact one with the other; are contiguous, but without continuity of structure. And here we cannot do better than to quote an important principle from the pen of another: "*Continuity of structure is not essential for the propagation of nerve impulses;*

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cells and fibers may functionate by contact only."

How the physiological connection is established between the end brush of one cell and the body of the other cell, we do not at present know. There are theories with reference to this, but these we cannot discuss here.

FUNCTION OF THE MOTOR CELLS.

Using the term *cell* in its broadest application, as indicated above, to indicate the cell body and all its processes, the function of the motor cells may be considered under the following heads:—

1. Nutrition.
2. Generation of nerve energy or nerve impulses.
3. Transmission of nerve energy or nerve impulses.

The cortical motor cell with all its processes forms a trophic unit. The spinal motor cell with all its processes, and the muscle fiber with which it is in physiological relation, form a trophic unit. In each case the cell body is the center of nutrition for all its parts, and this function is undoubtedly dependent on the presence of its nucleus.

Hofer has shown that when the amœba is divided into two parts, one containing a nucleus and the other deprived of its nucleus, the part which contains the nucleus will continue to live and perform the function of the cell, while the part deprived of its nucleus, although it does not immediately die, yet in a short time perishes. Many other instances of the dependence of the nutrition of the cell on its nucleus might be cited. Likewise, when a portion of the nerve cell, *e. g.*, the axis cylinder process, is severed from the cell body, which is its trophic center, although it may continue for a time to live, and even to conduct influences when stimulated, it eventually dies. Destruction of the body of the cell is followed by a degeneration of all the processes of the cell. The nutrition of all parts of the cell is therefore subserved by the cell body with its nucleus.

We may in this connection consider the degeneration of nerve fibers. The nerve fiber is usually described as made up of three parts. From within outward these parts are the axis cylinder, which is a direct continuation of the axis cylinder process of the cell, the medullary sheath, and the neurilemma. Nerve fibers in the central nervous system, *e. g.*, the fiber formed by the axis cylinder process of the cortical motor cell (see 2, 2, 2, of frontispiece), have no neurilemma.

Degenerations considered in their causal relation may be described as primary, secondary, and toxic.

Primary degenerations are due to some abnormal condition acting in the nerve cell or nerve fiber itself, a faulty nutrition. In this form there is a slow and gradual disappearance of the axis cylinder and the medullary sheath.

The secondary form is due to some cause acting outside of the nerve fiber or nerve cell. It occurs when the fiber is severed from the nerve cell from any cause, or is compressed or destroyed by neoplasms, inflammation, or injuries, or when the nerve cell itself is destroyed. The changes that occur in the nerve fiber in secondary degeneration have been studied mostly in the lower animals, but the changes have also been demonstrated in man.

These degenerative changes are first noticed in the medullary sheath, and by the method of staining, as introduced by Marchi, these degenerative changes can be readily recognized in their very early stage.

The medullary sheath breaks up into segments, becomes granular, the segments become smaller and smaller, and oil globules make their appearance. The axis cylinder of the fiber is also broken down. The products of degeneration pass through the nerve sheath, and are taken up by the connective tissue cells and lymphatic cells in the vicinity. When this process is complete, the medullary sheath and axis cylinder are completely destroyed, and nothing is left but an empty fibrous sheath, the neurilemma. In the rabbit the first changes are noticed in the medullary sheath at the end of twenty-four hours.

The first complete interruption of the axis cylinder and medullary sheath is at the end of the second day, and by the end of the second week the degenerative process is complete, nothing being left but the fibrous sheath of the nerve.

In man the degenerative process is somewhat slower than in the rabbit. Segmentation is not complete until between four and eight days. The nature of the process is essentially the same. The degenerative changes take place in all parts

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of the fiber belonging to the cortical cell and below the lesion, about the same time; but in the peripheral fibers, as the fiber belonging to the spinal motor cell, it is not certain whether the degeneration begins in one part of the severed segment before another.

In the toxic form of nerve degeneration the nature of the changes are the same as those already described, but are milder in degree, and are caused by some poison in the blood, which may be due to infection, or to chemical poisons, such as alcohol, lead, and arsenic. In this form the degenerative changes affect the peripheral part of the fiber first. This part is farthest removed from the cell body, the center of nutrition, and hence has least resistance to poisonous substances which may come in contact with it.

A very important function of the nerve cell, which we may also mention under the head of nutrition, is its power of regeneration.

Nerve tissue is the only specialized tissue that is capable of rebuilding itself when once destroyed. This can only occur when the body of the cell is in a healthy condition, and when there is little or no mechanical obstruction to the union of the central and peripheral sections of the divided fiber. This regeneration is accomplished by the axis cylinder of the central section dividing up into several new axis cylinders which grow outward and enter the severed peripheral section, and become inclosed in a new myelin sheath and neurilemma. In this process the peripheral section of the divided fiber takes no active part, except simply to furnish a path for the outgrowing central axis cylinders. This, however, is essential to the growth of the new fibers.

The time necessary for complete regeneration depends on the length of the nerve. In short nerves it may be complete in a few weeks; while in a long nerve, like the sciatic, it may require one or two years.

Central nerve fibers, as for instance the fibers formed by the axis cylinder process of the cortical motor cell (see 2 of frontispiece), do not have this power of regeneration to the extent that the peripheral fibers do when severed from the cell body.

The above facts have a very important practical application when rightly applied and interpreted, for they help us materially in prognosticating diseased conditions that affect the motor path in its different parts, when once the seat of the disease is located.

The other function of motor cells, namely, that of generating and transmitting nerve energy, we must in this connection dispose of briefly.

We may regard the cortical motor cell as giving rise to nerve impulses which travel in a wave-like manner along its axis cylinder process to its termination in the end brush. While there it brings about in some way changes in the spinal motor cell, which in turn develops a nervous impulse which travels along its axis cylinder process, terminating in the muscle in which it produces contraction.

We cannot here enter into a discussion of any theories as to how these nervous impulses arise in the cortical motor cell. Suffice it to say that this action is in all probability not automatic. The nervous impulses do not arise without any obvious external cause by the action of cell substance. In the spinal motor cell we have a cause acting outside of the cell, namely, the nervous impulse which comes to it from the cortical cell, which is a sufficient explanation as to how these impulses arise within the spinal motor cell. Just how the cortical motor cell acts upon or influences the spinal motor cell, which are distinctly separate anatomically, we do not know. On this point we could only theorize. Again, we should keep in mind the fact that while the cell body is usually the part concerned in the generation of nerve impulses, this function may also be subserved by the nerve process; for when the nerve process is stimulated, nervous impulses travel along it.

Without entering further into detail, then, we can consider that the body of the nerve cell is the principal agent concerned in the generation of nervous energy, but that the nerve fiber may also perform this function; and again, that the nerve fiber is the chief agent concerned in the transmission of nervous impulses, but that this function in turn may also be subserved by the body of the cell, and we have an illustration of this in the spinal motor cell of the cord. Nervous impulses must certainly travel over the spinal motor cell in order to complete their journey to the muscle.

(To be continued.)

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THE NON-SURGICAL TREATMENT OF OVARIAN DISEASES.

BY J. H. KELLOGG, M. D.,
Battle Creek, Mich.

(Concluded.)

In cases of functional ovarian disease I also make great use of the Swedish system of pedagogical or educational gymnastics. I visited Stockholm, Sweden, some eleven years ago, for the express purpose of becoming better acquainted with the Swedish system, which I was able to do through the courtesy of Prof. Hartelius, the Director of the Central Institute for Swedish Gymnastics, at Stockholm. This system consists of what might be termed a regular alphabet of fundamental movements which may be so combined and varied as to make many thousands of different movements of varying degrees of vigor and bringing into action all the important muscular groups of the body.

Used alone, as before intimated, exercise is of comparatively little value in the treatment of invalids of this class. It may be a source of infinite damage. My greatest difficulties have been with cases of ovarian disease in which exercise had been undertaken indiscreetly, or under unwise management, resulting in so much suffering that the patient was thoroughly convinced that exercise was the most dangerous thing possible, and must be studiously avoided.

To lead a patient who has been confined in bed for several years from ovarian disease, out of her feebleness and her invalid ruts, up to the enjoyment of robust health and vigor, requires the nicest management, the closest attention to details, and a much larger knowledge of the physiological effects of exercise, than is possessed by the ordinary teacher of gymnastics, or by professional trainers of persons in ordinary health. An infinite amount of patience is required on the part of the physician, and if he has any considerable number of patients to care for, skilled and experienced assistants are also essential.

Before exercises of any considerable vigor are undertaken, it is also essential that an accurate diagnosis of the condition of the patient's muscular system should be made. The ordinary system of anthropometry is of almost no value for this purpose. This system answers fairly well for growing youths, such as ordinarily come under the care of the director of gymnastics or physical culture in connection with a school or college, since in this class of persons there is not so likely to be found any very extraordinary abnormalities as regards muscular symmetry; but in adults, and especially in young women whose physical education has been neglected, it may work most disastrously.

In most of the cases to which this paper relates, there will be found very great disparity in the degree of development in the muscular groups of the different parts of the body. This condition is the rule, rather than the exception. The arms or legs may be able to do nearly an average amount of work, while the muscles of the trunk are so weak that an amount of exercise not sufficient to exhaust or even tire the legs or the arms, may quite overdo, and perhaps temporarily injure, the muscles of the loins. It is of the highest importance to find the weak spots in each individual case, and adapt the exercise to the case, with such care and precision that the asymmetry in the muscular development will be overcome. When muscular symmetry has been established, such all-around exercises as tennis, bicycle riding, mountain climbing, etc., become safe and beneficial. The same may be said respecting calisthenics and other all-around gymnasium exercises.

The purpose of this article is not to belittle the importance of gynecology, or to discount the value of local measures in the treatment of pelvic disorders, but to emphasize the need of recognizing and utilizing those measures of regimen and treatment which are capable of reorganizing and renovating the entire body, so impressing the whole organism that the patient will be fairly lifted out of the ruts into which her malady has led her, and elevated above the level of disease, up to the high-water mark of health and vigor in every bodily organ and function. It is the opinion of the writer that when medical men come to appreciate the fact that *patients* are to be treated, not simply *maladies*; that the woman suffering from functional ovarian diseases needs, not simply the treatment of her diseased ovaries, but needs to be made a better animal, a more vigorous, less sensitive, and more highly vitalized woman, a vast

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number of women who are now languishing on beds of suffering or dragging out lives made miserable by chronic invalidism and perpetual treatment, will be restored to health and usefulness; and a very large number of young women who are now subjected to the operation of ovariotomy, will escape the surgeon's knife, and become happy wives and mothers, to the credit of rational non-surgical gynecology.

In a number of the cases mentioned in this paper, the operation of ovariotomy had been recommended and urged by physicians and specialists previously consulted, and in several instances the operation would unquestionably have been performed if the patient had not recovered through the employment of the means described, the patient coming under my care at the Sanitarium through the urgent solicitation of friends who had been former patients, and coming to us as a last resort before the adoption of the radical measure of surgery.

I consider the cure of a case of ovarian disease by non-surgical means, a vastly greater triumph than the most successful laparotomy or a long series of successes, and take greater satisfaction in knowing that I have been instrumental in restoring to health and usefulness a young woman whose life was made wretched by chronic pelvic pain, than in the removal of a huge ovarian cyst or a uterine fibroid. It seems to me that much evil arises from the too distinct specialization of work among gynecologists. A specialist in gynecological surgery perhaps too often ignores the value of those slowly operative measures which require time and patience to secure results; while on the other hand it is perhaps still more frequently the case that medical gynecologists exhaust their patience and the purses of their patients by fruitless efforts to cure structural diseases of the ovaries, which operative measures alone will cure. There is no class of cases in which sound judgment, good common sense, and a conscientious regard for the patient's best interests, are so much required as in cases of this sort, and there is certainly no class of cases in which the highest degree of skill and precision in diagnosis is more essential to success, nor in which the reward of patient and painstaking effort is more gratifying to both patient and physician.

THE INTERNAL SECRETION OF THE KIDNEYS.

DEMONSTRATED BY PHENOMENA OF ANURIA AND URÆMIA.

BY M. BROWN-SEQUARD.

Translated from *Archives de Physiologie* for November 1893.

[D'ARSONVAL reports, in a recent number of the *Archives de Physiologie*, the results of a series of experiments which seem to demonstrate that the kidney possesses an internal secretion of very great importance. Brown-Sequard found that an animal dying as the result of removal of the kidneys, was revived to a remarkable degree by the injection of the renal liquid prepared in the same manner as orchatic liquid. ("Comptes rendus, de l'Acad. des Sciences," 1892, tome CXIV, note, p. 400.)—J. H. K.]

The knowledge of the fact that the kidneys produce an internal secretion, places in a new light the facts of anuria and uræmia. We may recognize three distinct types, as regards the absence of the secretion of the kidneys: 1. Both internal and external secretions absent: 2. Internal secretion absent, the external approximately normal; 3. The external secretion absent, the internal normal.

The first of these types exists in cases of experimental removal of both kidneys, and sometimes, in man in certain organic affections in which the whole glands are affected, and in which anuria is associated with uræmia. The symptoms of intoxication by accumulation, in the blood, of the poisons ordinarily removed by the urine in this class of cases, show themselves in all their intensity.

The second type exists in cases of nephritis or other diseases of the kidneys in which nearly the whole of the renal tissue is affected. The external secretion, then, continues more or less, and numerous facts show that there is no necessary relation between the uræmic phenomena which exist in these cases and the quantity or composition of the urine. The internal secretion, on the contrary, is absent, or affected more or less profoundly, and it is this which gives rise to the uræmic manifestations.

The third type, in which the external secretion alone fails, shows itself in cases of complete anuria, in which a considerable part, at least, of one of the kid-

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neys is organically sound.[1] The fact that there are not, in such cases, any morbid manifestations, even after seven, eight, ten, twelve, twenty days, and even longer, demonstrates in a most striking manner our conclusion that the uræmic phenomena do not depend, as is generally believed, upon an accumulation in the blood of the poisons of the urine.

The history of these cases of anuria is extremely important. They should have led us, long ago, to the conclusions to which I have arrived, and which are presented in this work.

In the excellent thesis of Merklen, (*"Étude sur l'Anurie,"* Paris, 1881, p. 83,) we read as follows: —

"As a rule, all the principal functions of the body are preserved intact for several days after the onset of anuria due to obstruction by calculus, and it is not without atonishment that we see a patient who has not passed a single drop of urine for several days, walking about, eating, even engaging in intellectual work, with all the appearance of health. The prolonged period of tolerance is one of the peculiarities, most singular, as also most characteristic, of anuria due to calculus, and of obstructive anuria in general. This period lasts, on an average, from seven to eight days."

I may add that the period may continue as long as twenty-eight days. (See the case of Whitelaw.)

As to the external secretion of the kidney, the same fact is well established by the researches of Tuffier, and those of Bradford. (*Journal of Physiology*, Vol. 12, No. 3, 1891.)

Schuchardt reports a case in which scarcely one seventh of the parenchyma of the kidneys was able, in a man, to maintain the normal secretion of the urine.

The author reports a number of cases in which suppression of the urine existed for a week or more without symptoms of uræmic poisoning, and cites a number of remarkable cases reported by others, which we briefly summarize as follows:—

Complete suppression of the urine for thirteen days without uræmic symptoms. —*Sir James Paget.*

Anuria for sixteen days with scarcely a symptom of uræmic poisoning, with the exception of vomiting on the fifth day. —*Merklen.*

A case in which a patient went about attending to his affairs, notwithstanding anuria which had lasted thirteen days.—*Anglada.*

A case in which there were no uræmic symptoms for twelve days and after, until the twentieth day, no symptom except profuse perspiration. At the end of that time, œdema of the limbs appeared.—*Russell.*

A case of cancer of the uterus with suppression of urine for fifteen days before death. The patient ate as usual, slept well, tongue moist, pupils normal, pulse 84, temperature 99° F., until the day preceding her death.—*Roberts.*

A case of anurea for nine days without other symptom than loss of appetite. There was then a free discharge of light colored urine of low specific gravity, when the patient recovered. —*Roberts.*

The cases cited demonstrate that the accumulation of the poisons of the urine in the blood may occur for a considerable time without any morbid manifestation. They proved, in fact, that anuria may exist without a trace of uræmic poisoning for from seven to twenty-eight days.

If we compare these cases with those which are furnished us by experimental nephrectomy ligature of the ureters, on the one hand, and of the injection into the blood of normal urine, on the other hand, we shall be obliged to recognize the fact that it is impossible to reconcile these different cases with current opinions. In fact, when the urinary secretion is suppressed by ablation of the kidneys, or by ligature of the ureters, death occurs at the end of one or two days in the rabbit and the guinea-pig, and after two or three days in the dog. If, then, death was due in these cases to the absence of the urinary secretion, death should occur in two, three, or four days in cases of anuria in man. Now the facts which I have reported not only show that life may continue two, three, four, or even six or seven times as long as this period of three or four days, but also that the uræmic symptoms do not appear until after thirteen, fourteen, sixteen, twenty, or even twenty-eight days.

(To be continued.)

[1] We know that it is a general rule with the glands (pancreas, thyroid, testicle, etc.), that their internal secretions may continue without alteration when only a part of the organ remains.

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TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

NEW INVESTIGATIONS CONCERNING CHANGES IN THE BLOOD, RESULTING FROM APPLICATIONS OF HEAT AND COLD.

BY PROF. W. WINTERNITZ, M. D.

Translation.

[IN March, 1893, Prof. W. Winternitz, of Vienna, published in the *Centralblatt für Klinische Medezin*, Nr. IX, a preliminary contribution respecting the relation of hot applications to leucocytosis. Rovighi, a few weeks before, read at a medical congress in Rome a communication giving the results of investigations which he had made upon rabbits and men relating to the same subject. Dr. Wm. S. Thayer, of the Johns Hopkins Hospital, and others, have since repeated these investigations, and have verified the results announced by Winternitz and Rovighi. Studies made within the last few months in the Physiological Laboratory connected with the Battle Creek Sanitarium, have developed results agreeing entirely with those which have been noted by other observers. In a recent number of the *Blätter für Klinische Hydrotherapie*, we find another communication from Dr. Winternitz, which is of interest. We translate a portion of this article, which details the results obtained.—J. H. K.]

"The results of our investigations, which were undertaken mostly with healthy persons, or those who were only slightly anæmic, are as follows:—

"1. An increase of red blood corpuscles was found in all general thermic and mechanical applications in which the entire surface of the body was involved, such as the cold wet sheet rub, towel bath, plunge bath, half bath, all sorts of douches, involving the whole surface of the body, the vapor bath followed by a cold application, the alternate hot and cold douche (the so-called Scotch douche), and the cold half bath (with a few exceptions which will be mentioned later). The blood examined was taken from the finger tips or the lobe of the ear. As observed in our former investigations, there was, at the same time, a constant increase in the number of leucocytes, and also in the amount of hæmoglobin.

"2. The maximum increase of red blood corpuscles observed in fifty-six persons examined, was 1,860,000 per c. mm. The maximum increase of leucocytes was to the extent of three times the ordinary number. The maximum amount of hæmoglobin observed was fourteen per cent.

"3. The maximum increase was not recognized in all cases immediately after the application. The highest figures were often found at the end of an hour. It is also worth remarking that an increase of leucocytes was often observed after the number of red corpuscles had begun to increase. This notable change in the composition of the blood was maintained during various periods of time, and could often be observed for so long a time as two hours after the application of the experiment, although in most cases a decrease in the number of blood cells of both kinds was observed at the end of two hours.

"Further investigations and researches are necessary to determine the length of time required for the disappearance of the changes in the blood induced by thermic applications.

"The relation of the white blood corpuscles was somewhat less constant than that of the red blood corpuscles; rarely when there was a distinct increase in the red blood corpuscles, the white corpuscles were observed to be absolutely and relatively smaller in number.

"It must be considered as established, that after cold applications involving the whole surface of the body, blood taken from the superficial vessels shows the changes which have been above described.

"4. Our investigations have taught us, furthermore, that active muscular movements produce a similar, though not quite so pronounced, an effect. The number of the red blood corpuscles which had increased as the result of the application of cold, was still further increased by the reaction, and even without the previous application of cold the number of red corpuscles was increased after violent agitation.

"5. The effect of heat has not yet been sufficiently investigated to give us definite facts. Vapor baths, hot-water baths, electro-ferric baths (after Gärtner's sys-

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tem), in some cases showed, immediately after the bath, a decrease in the number of red corpuscles. In some cases, especially in healthy and full-blooded persons, this condition was followed, after a time, by a moderate increase in red corpuscles. The influence of heat, however, requires a deeper and closer study.

"6. Quite different results were found in blood taken from the finger or the lobe of the ear after local thermic applications. Cold applications to the lower half of the body, such as, the cold foot bath, the cold douche to the feet and lower part of the thigh and knee, and also the sitz bath, produced, though not constantly, a decrease of the number of red corpuscles and leucocytes found in blood taken from the finger or the lobe of the ear. At the same time there was observed in the parts which were exposed to thermic and mechanical irritation, a marked increase of both red and white cells.

"As regards the explanation of the changes in the elements of the blood resulting from cold applications or from muscular work, the question naturally arises, Can the immediate increase of the red and white cells of the blood be considered as a new formation? Very slight reasons can be offered in support of this hypothesis. When we consider that we often endeavor for months in vain to effect an increase of hæmoglobin and blood corpuscles, even in simple anæmia, or chlorosis, it must appear to us very improbable that the hæmatopoiesis can be effected so quickly as by the effects of cold applications. That there could be an error of observation in the examination of more than sixty cases, all giving the same results, seems hardly probable. The increase of the red corpuscles and leucocytes is too large for this. Besides, our former investigations have been confirmed by other reliable investigators.

"Numerous facts indicate that the additional cellular elements are cells preformed in the blood, which, after the application of cold, come into the general circulation. The swelling of dependent parts of the body, which can be demonstrated by means of the plethysmograph, and the decrease in size of parts of the body placed at a higher level; the globule stasis of Hueter; together with the sudden increase of the red blood corpuscles to the extent of some millions in a few hours at the critical periods of febrile diseases, prove that a sudden increase of the red corpuscles in the circulation of the blood may be explained in a different manner than by the hypothesis of a new formation. The fact that after applications of heat the number of red corpuscles seems to decrease, indicates in what direction we should look for an explanation of the increase after cold applications, and after muscular work, namely, *the changes of the blood circulation, the action of the heart, and the tonicity of the vessels and tissues.* From organs in which, under ordinary conditions, storage, accumulation, and stasis of red and white blood corpuscles take place, the blood cells are thrown under favorable conditions by being carried through the circulation into the general blood current. That this might be the case I have endeavored to demonstrate in my numerous former papers.

"The decrease of the red blood corpuscles resulting from local cold applications, the increase in the parts of the skin to which the applications are made,— in the toes, after the foot bath, for example,— demonstrates still more clearly that we have to deal with a change in the distribution of the cellular blood elements.

"It therefore clearly follows that the effect of these blood changes, as regards intimate tissue processes, will be similar to those which would result from a real increase of blood corpuscles. The elements of the blood which had previously been stagnating in the various organs and vessels, and which were useless to the blood circulation and its functions, are conveyed into the circulation, and are, in the lungs, filled with oxygen, and facilitate the vital processes in the tissues and organs in exactly the same manner as if they were newly formed blood corpuscles.

"This explains also the results of my investigations which I undertook with my assistant, Dr. Otto Popischil, concerning the gaseous exchanges in respirations, showing how, after applications of cold, the reception of oxygen and the throwing off of carbonic acid gas must increase considerably. The blood, richer in cells and oxygen, is then able to effect all the tissue processes more perfectly.

"As I have for many years believed, we should not seek, in the influence of temperature alone, the effect of different temperatures upon the vital function.

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There is still another point to which our attention is directed by this method; namely, this: It may be found that the larger or smaller increase of the red blood corpuscles may constitute a measure by which to determine the complete or incomplete reaction of thermal and mechanical applications. This is something for which we have long sought in vain.

"Many careful comparative studies must yet be made before we can reach a final and decisive conclusion, but the results which we have thus far reached seem to indicate the probability that the degree and perfection of the reaction stand in equal relation to the increase of the red corpuscles after the applications made. This is especially true in anæmic cases. For some hours after applications in these cases, the number of blood corpuscles and the amount of hæmoglobin continues to increase, the blood becomes more natural and normal, and with it also, all the processes of nutrition. By systematic repetition, this first temporary effect becomes a lasting and permanent one. I have seen many cases of obstinate anæmia and chlorosis which were cured by this method.

"We are thus able to explain, also, the principle which has already been established empirically, that short and transient, but energetic and oft-repeated, thermic applications are most appropriate in cases of anæmia. After each application there follows a short period of more favorable conditions for nutrition, which gradually results in normal maintenance.

"So I believe that the phrase, Improve the blood-making process, which plays so important a role in general therapeutics has an experimental foundation."

Rational Study of Cancer. — Dr. Power, of England, presents, in the *British Medical Journal* (October, 1893), an interesting account of studies which he has made for the purpose of determining the effects of chronic irritation upon living tissues. The most interesting point in his paper is the fact that he finds it possible to produce a cancerous growth by inoculation, provided the part inoculated has been previously prepared by a long-continued irration. He also finds in the tissues subjected to long-continued irritation, many appearances which closely resemble what is found in cancer.

CONTRIBUTION TO THE STUDY OF FATIGUE.

BY J. E. ABELOUS.

Translated from *Archives de Physiologie Normale et Pathologique*, by J. H. K.

EXPERIMENTS made long ago by Helmholtz, du Bois-Reymond, and Ranke, and the much more recent experiments of A. Mosso, have established the fact that there are produced, in the course of muscular work, toxic substances, the results of tissue disintegration, an accumulation of which in the body gives rise to fatigue.

Ranke, by injecting into the muscles of a frog an aqueous extract prepared from the muscles of an animal of the same species fatigued by prolonged muscular contraction; and A. Mosso, by injecting into the veins of a normal dog some of the blood of another dog tetanized during a certain time, have observed, as a result, the phenomena of fatigue.

It is the purpose of the present memoir to study the mode of action of these substances thus elaborated in the course of muscular work. We know, from the numerous researches which have been made, that muscular fatigue may be the result of two factors,— first, exhaustion, that is to say, exaggerated waste, and consequently a lack of material necessary for work, which plays, in all probability, only a secondary role. Ranke, in fact, has shown that it is sufficient to cause to pass into the vessels of a fatigued muscle a simple physiological solution of marine salt, to restore to it immediately its aptitude for work. In this case, the saline water acts only by washing out of the muscles the products of tissue waste which accumulate in the interior of a fatigued muscle. It is, then, to the second factor, the intoxication, that we must attribute the greater part of the phenomena of fatigue.

Upon what elements do these toxic substances act? Their action is gradual and progressive.

When one excites an animal, a frog, for example, with a faradic current with very frequent interruptions in such a manner as to produce general tetanus, we observe, at the end of a certain time, that the excitation of a motor nerve, the sciatic, for example, even with very strong currents, no longer produces muscular

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contractions, notwithstanding that the direct excitation of muscles with currents of most feeble intensity provokes very distinct motor reactions. At this phase of fatigue, the animal is absolutely comparable to a curarized animal. It is not, in fact, the nerve-trunk itself which has lost its excitability. The indefatigability of nerves is to-day established beyond all doubt by the experiments of Bernstein, by Wedenskii, and by Bowditch. It is the union of the nerve and the muscle which is alone affected. At a more advanced period of the experiment, the muscle itself is affected, and its direct excitation no longer provokes contraction. It is this passing phase, this paralysis of the motor terminations in the course of experimental fatigue, which I propose to study, especially those experiments which have been made upon the frog. These may be divided into two series: —

1. The effects of tetanization after anæmia of a part; and —

2. The effects of tetanization after enervation of a part. [The author describes minutely a large number of experiments which were carried out with very great care, from which he draws conclusions as follows: —

We find, in the above facts, a clear demonstration that auto-curarization manifests itself at a certain period of fatigue. This fact has not failed to strike physiologists who have studied muscular fatigue. In a memoir published in *Brain*, A. Waller indicated these phenomena.[1] On the other hand, in his fine researches upon the law of fatigue, Prof. A. Mosso has demonstrated that the personal type of fatigue remains identical, even when the action of the will is excluded,—that is to say, when one excites directly the motor nerve, upon which we understand that psychic influence exercises no preponderant action, and that fatigue may be also a peripheral phenomenon.[2]

In experimental fatigue provoked by electrical excitation inducing neuro-muscular activity, this peripheral paralysis plays a preponderant role. The experiments which I have presented demonstrate clearly, it seems to me, the existence and the mechanism of this paralysis of the terminal motor plates.

In a series of experiments it was found that paralysis due to auto-intoxication occurred in the nerves of parts which were not made to act, an effect which can be explained only by the transportation through the circulation of toxic substances possessed of curarizing properties which are elaborated through the work of the muscles of other portions of the body. This paralysis affected not only the homonomous members, but also to a certain degree then anterior limbs, the experiment being conducted upon the posterior limbs. This intoxication is peripheral in character, since the centripetal conductivity of the nerves remained intact, and the excito-reflex properties of the cerebro-spinal axis were not affected. Parts from which the blood supply was cut off enjoyed immunity from the paralysis which affected the rest of the body. The explanation given for this was as follows: —

"In the intact member, where the circulation is free, the paralysis is the consequence of the poisoning of the motor terminations by the substances elaborated in the course of the neuro-muscular work. It is the products of disintegration produced by the entire animal which paralyzed the motor termination of the intact member. In the anæmic parts the nerve terminations are acted upon only by the toxic substances formed *in situ;* consequently these substances are much less considerable in quantity than those which, thanks to the incessant circulation of the blood, irrigate the termination of the limb not ligated."

Résumé. — These experiments show that in the course of fatigue the body manufactures toxic substances which at a given moment produce a veritable curarization of the animal. When the fatigue is pushed to its extreme limit, the irritability of the muscle itself is notably affected, as is remarked by M. Waller in his memoir. In voluntary fatigue, the effects are not so profound, for the nerve centers first affected act, so to speak, as regulators, the central fatigue preceding the peripheral fatigue, and thus preventing the individual from going to the point where peripheral fatigue is produced. But it should not be forgotten, however, that even in involuntary fatigue the peripheral element plays an important role, as has been established by Mosso and his pupils. The experiments of which I have presented the results, will perhaps contribute to the elucidation of the mech-

1 A. Waller, "The Sense of Effort; an Objective Study." (*The Brain*, 1891, vol. 14, p. 218.)

2 A. Mosso, "La Fatica," chap. 4, p. 106.

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anism of this peripheral fatigue, which appears to consist essentially in an autocurarization.

A NEW VIEW OF THE PROSTATE.

In his admirable address before the American Medical and Surgical Association, Dr. White presented some exceedingly interesting views and facts relating to the prostate. The obstinacy with which diseases of the prostate resist the ordinary methods of treatment, and the hazardous character of most of the operations which have been performed for the relief of chronic enlargement of the prostate, have given to this subject a very great interest. The morbid conditions which affect the prostate are, in themselves, of comparatively little importance, but the secondary conditions which grow out of them are often of so grave a character as not only to destroy the comfort of the patient, but to menace his life. This is especially true of the changes in the bladder which are occasioned by mechanical obstructions; by disturbance of circulation through pressure upon the prostatic veins which receive the blood from the vesical veins; by septic infection by the use of dirty instruments, or otherwise.

The new view advanced by Dr. White, representing the nature of the prostate, is that it is especially a sexual structure, and that its enlargement is due to the development within its structure of new growths similar to those to which the uterus is subject.

"Palliative treatment consists (*a*) in the systematic use of steel sounds for purposes of dilatation; or (*b*) in the employment of the catheter, and is of the greatest value in a very large number of cases.

"(*a*) *Dilatation.*— A patient who presents the symptoms of the prostato-vesical congestion of the early stages of hypertrophy, who is disturbed once or twice at night, who has an enlargement of moderate density, appreciable through the rectum, but not offering much resistance to the introduction of an ordinary catheter, and who has but little residual urine, is likely to derive great benefit from the systematic introduction of full-sized steel sounds.

"(*b*) *Catheterism* should be systematically employed in cases in which the quantity of residual urine is two or four ounces or more, and in which the introduction of the instrument is easy and painless, and the urine is sterile. The frequency should be proportionate to the amount and character of the residual urine.

"The objections to habitual catheterism in prostatics are, (1) the risk of vesical infection: and (2) the production of vesical atony.

"In what cases should some operative procedure be recommended? It may be said at once that in those patients with but moderate obstruction, or with a high grade of compensatory hypertrophy of the bladder, with a small amount of residual urine which remains sterile, and in whom catheterism is easy and painless, operation is not to be thought of. The time may come when, by perfecting our methods of diagnosis and our operative technique, this class of prostatics may be benefited by active surgical interference, but it has not yet arrived. Dilatation and catheterism, as above described, at present represent the best therapeutics, and, if the rigid observance of details of antisepsis is never lost sight of, will in a fair proportion of instances see the patient comfortably through life.

"But it must be said with equal positiveness that in the great majority of cases it is at the termination of this stage, when the approaching 'break down' in catheter life first begins to manifest itself, when instrumentation becomes more difficult, more painful, or more frequent, when the urine shows fermentative change and the vesical congestion merges into a true cystitis, that the most valuable time is lost to both patient and surgeon. It is just then, that, on the other hand, operation is for the first time clearly indicated and justified, and, on the other hand, that it promises most.

"In the absence of evidence of advanced and threatening renal disease of an infective character, but few prostatics, no matter how marked their local symptoms, should at the present day be denied the chance of relief afforded by operation. In this statement are included not only the cases with pronounced vesical asepsis, but also those in which there is atony; with more or less complete retention; with general sclerosis, rigid vessels, polyuria, and hyaline casts; with even the toxæmia above al-

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luded to. The evidence already presented to the profession seems to warrant this opinion, in spite of the unfavorable views as to the operative interference formed and expressed by such excellent and experienced observers as Socin, Guyon, and Sir Henry Thompson.

"As to the choice of operation, we are limited to the following methods, which are mentioned in the order of their gravity, as estimated by their probable risk or by their mortality as determined by existing statistics: 1. Overstretching of the prostatic urethra; 2. Perineal prostatotomy; 3. Perineal prostatectomy; 4. Suprapubic prostatectomy, which is the operation to be preferred in all those cases in which palliative treatment having failed, there are unmistakable indications that the local conditions are growing worse, the general health remaining as yet unaffected. The best possible period is that before the development of marked and continuous cystitis, while some power still remains in the vesical walls, and the bladder is neither thinned and dilated, nor rigid and contracted. Under these circumstances, in the presence of a patient who reports that he is disturbed at night with increasing frequency, that he is obliged to use the catheter oftener, and not only does so with greater discomfort but with less relief in the interval, that the urine is occasionally turbid and offensive, that he has recently had one or more attacks of complete retention, and that he is beginning to lose flesh and appetite, — the indications for operative interference are unmistakable, and the suprapubic method is obviously the one to be selected."

Later in his address, Dr. White suggests the possibility of utilizing still another procedure in the treatment of these cases; namely, castration. Although not recommending this as a remedy for enlarged prostate, he presents a very convincing array of evidence that removal of the testicles produces atrophy of the prostate just as the removal of the ovaries produces atrophy of the uterus. This fact is proven not only by the observation that there is a natural tendency to atrophy of the prostate in old age, but also by the observation first made by John Hunter that the prostate gland of the mole is, in winter, "hardly discernible, but in the spring (when sexual activity begins) being very large and filled with mucus." Corresponding changes have been observed in the hedge-hog, by Owen and Griffiths. Owen also observes that the prostate of the perfect bull is soft and bulky, while that of the castrated animal is "small, flabby, tough, and ligamentous." In his investigation of the subject, Dr. White, aided by Dr. Kirby, made a large number of experiments upon dogs, and found as a result of castration rapid and almost complete disappearance of the prostate in every case. This observation is certainly very interesting, and may lead to the development of a method by which men, whose lives are so miserable as to be almost beyond endurance, may be relieved of their suffering in the same way in which women are now frequently relieved of the inconvenience attending the development of fibroid growths of the uterus.

Menopause in Healthy Women. — In the January number of *Merck's Bulletin*, Dr. Bigg states the following conclusions from his studies of this subject: —

1. In women whose nutrition has uniformly approximated the normal standard, and who come to this period unhampered by pre-existing ailments, the final cessation of menstruation occurs without natural disturbance of the functional harmony, and is often of cosmetic advantage.

2. The association of morbid conditions with the menopause is accidental, and the result, usually, of antecedent causes, especially of unphysiological living.

3. The influence of perfect nutrition and natural living during the pre-menstrual and adolescent years upon the after-life of woman, is of the most salutary and far-reaching kind. Hence, —

4. It is of the utmost importance that medical men should unceasingly impress this fact upon the mothers of girls, and initiate a natural development of their physical organism by the use of wholesome and nutritious diet at regular intervals, by abundance of outdoor exercise, by the avoidance of late hours, and by a system of school instruction which shall be graduated to a rational output of mental energy by the adolescent faculties.

We entirely agree with these observations of Dr. Bigg. The writer has taken considerable pains to inquire into the

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conditions which prevail among savage women as regards their sexual life, and has been unable to find any evidence of disturbance occurring during the menopause in women living in a primitive state. As a rule, vigorous laboring women suffer very little inconvenience at this period, unless they have previously suffered from derangements of the generative organs due to child-bearing, faulty dress, or some other error in hygiene. The idea held by many physicians that women must necessarily enter upon a period of invalidism with the ushering in of the menopause, we have long believed to be erroneous.

Development of Uterine Fibroids. —An interesting report of the results of a careful study, during many years, of one hundred cases of uterine fibroids, published by Kleinwächter, presents many interesting facts in relation to these growths, which were not previously understood. Among other conclusions drawn by the author, are the following:—

1. There is no fixed rule for calculating the age of a fibroid from its size. These growths usually develop rapidly, from a small lump to a large tumor.
2. A sudden increase of a large fibroid is not an infrequent occurrence.
3. Fibroids usually continue to grow, and rarely diminish in size before the menopause.
4. A wasting disease of any sort may cause a fibroid to shrink.
5. Fibroids usually increase in size during pregnancy, and diminish, and may disappear, during the involution following confinement.
6. The development of large fibroids may be preceded by the growth of a smaller one.
7. The menopause has far less curative value in these cases than is generally believed. Fibroids often continue to grow after the menopause, sometimes more rapidly than before. [I have met a number of cases of this sort.—J. H. K.]
8. There is danger of malignant degeneration of a fibroid at the menopause.

New Method of Operating in Uterine Fibroid.—Kustner, of Dorpat, has recently adopted a method of operating in cases of uterine myomata in the mural variety of the disease, which was first suggested by Atlee many years ago. Duncan, Simms, and Gusserow have also suggested a similar plan. The method consists in dividing the operation into two stages, removing salient parts at the first operation, then packing the uterine cavity with gauze, and depending upon the contractile efforts of the uterus to facilitate the nucleation by bringing the tumor forward, so that at a second operation, performed at a proper interval, the remainder of the growth can be removed.

Operation for Œsophageal Stricture.—Abbie makes a gastrostomy, finds the cardial orifice, passes a string through the œsophagus to the mouth by means of a small bougie, and by seesawing the string makes room for bougies of progressively larger size, finally introducing a rubber tube of the same size as the largest bougie, passing the tube in beyond the point of stricture, the lower end passing outside the wound in the stomach. Another tube is passed into the stomach, through which nourishment is introduced. The patient is thus able to drink without contaminating the wound in the œsophagus.

Ichthyol for Acne.—Steam the face for half an hour with a vaporizer; wash it with a super-fatted ichthyol soap. Then apply 40 per cent of the ichthyol in collodion or bassorin. The application is better made at night; it should be washed off every morning. In cases in which there has been extensive scarring, apply salicylic acid, 10 per cent, ichthyol, 30 per cent, with vaseline.

Nervous Asthma.—Einthoeven, a Scandinavian physician, recently published an able article dealing with the causes and symptoms of nervous asthma. He cites the various theories of the origin of this disease; but in our opinion, none of them are correct. The real origin of the disease is a hyperæsthetic condition of the abdominal sympathetic nerve, which in many instances is due to disordered digestion. The writer has cured many cases of nervous asthma by curing the digestive disorder to which it was due. Dilatation and prolapsus of the stomach are very common in these cases.

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BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL WORLD, from original sources.]

Immunity against Cholera. — Dr. Klein has recently raised a question respecting bacterial poisons of considerable interest. A series of experiments made by him seem to show that the immunity against cholera produced by inoculation of animals with the culture of various microbes is induced by an intracellular poison manufactured by these organisms, and that an animal thus protected may be killed by the metabolic poisons produced by the microbes which are found in solution in the culture medium. Kanthack and Westbrook have recently reviewed Klein's experiments and extended them by experiments upon themselves. They find it possible to produce immunity in themselves, and also find that the serum of their blood possesses very marked immunizing properties.

The conclusions which they drew from their experiments are as follows: "As far as the cholera bacillus is concerned, (1) any one mode of immunization will protect an animal against an infection by any other form of innoculation used; (2) the serum of an animal immunized by any one method also protects guinea-pigs against an infection by any one of the various forms of innoculation mentioned; (3) the distinction between an 'intracellular' and a 'metabolic' poison in their relation to artificial immunity must not be made too narrow."

Inoculation with Leprosy. — Tedeschi has recently succeeded in inoculating a monkey with the bacilli of leprosy. The seat of inoculation was the dura mater of the spinal cord.

Infection by Staphylococcus Aureus. — Dr. Robin (France) reports a case of fatal infection with staphylococcus pyogenes aureus which occurred in a peculiar manner. A workman noticed a small pimple upon his face, which he scratched. Shortly afterward his face began to swell. General septic symptoms appeared, and he grew rapidly worse, dying at the end of a few days. Examination showed pneumonia, empyæmia, and general septic inflammation. Pure cultures of staphylococcus aureus were obtained from the blood and the tissues of the cheek and the lungs.

Anti-Rabic Investigations. — The bacteriological station at Odessa reports 644 persons as having been subjected to anti-rabic treatment during the year 1892. Of these persons, six had been bitten by wolves, 593 by dogs, thirty-two by cats, two by horses, and eleven had been exposed by the care of other persons affected by the disease. Of the 640 persons who finished their course of treatment, not a single one had died. Four persons died before the course of treatment was completed, the inoculation having evidently been begun too late.

Bacteriological Examination of Water. — Dr. Blachstein has recently made a series of experiments in the Pasteur Institute of Paris, in reference to the best mode of determining the quality of water by bacteriological investigation. His view is that the quality of the microbes found in water is of much greater importance than the quantity. His mode of investigation is to make a culture of water in bouillon. It is found possible to inject 2 c. c. (one half dr.) of bouillon culture of good water into the vein of a rabbit without injury, while ½–1 c. c. of the culture of the water of the Seine and other impure waters resulted in death within three or four days. Similar results were obtained in investigations with guinea-pigs and mice.

Examining Cholera Discharge. — The possibility that cholera may appear next year, although we were so fortunate as to escape during the present season, renders of great value an article which appears in the *British Medical Journal* of Sept. 9th, which gives a complete explanation of examinations made in the best British laboratories. The best material for the examination is the rice-water stool, or, if the patient has died, a portion of the lower ileum, ten or twelve inches in length.

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MOVABLE KIDNEY.

THE frequency with which this condition occurs among women seems not to have been recognized until quite recently. Several years ago the writer reported at a meeting of the American Medical Association, a long series of gynecological cases, in each of which careful examination had been made for the purpose of determining the position of the kidneys. Mobility of the right kidney was found in more than one third of all the cases examined. The relation of this condition to the extensive group of symptoms complained of by women supposed to be suffering from diseases peculiar to their sex, is of very great importance. Careful observation has convinced us that this condition is responsible, in a very large number of cases, for symptoms which are attributed to uterine or ovarian disease, when these organs really play a very insignificant part in the pathological conditions present.

In a recent number of the *American Journal of Medical Sciences*, Dr. Edebohls presented an elaborate article upon this subject, from which we quote as follows:—

"Atrophy, or absorption of the perirenal fat, is the chief ætiological factor in the production of movable kidney. Other causes assigned by various authors are: tight lacing, laxity of abdominal walls, congenital predisposition, and severe straining.

"A distinction should be maintained between movable and floating kidney.

"A movable kidney is one movable within a pouch or hollow formed within its own fatty capsule. A floating kidney has normal relations with that portion of its fatty capsule which it carries with it in its excursions, and is supplied with a mesonephron, the length of which determines the degree of mobility. This paper deals only with the movable kidney.

"The symptoms are likely to be more distressing in the earlier than in the final stages of the movable kidney.

"The most characteristic combination of symptoms of uncomplicated movable kidney is the following: Digestive disturbances, chronic in character; epigastric pain, usually located somewhat to the left of the median line; general nervousness; cardiac palpitation; inability to feel comfortable or to sleep when lying on the left side.

"The other symptoms associated with movable kidney occur less frequently, and are of secondary significance.

"The symptoms of movable kidney are accentuated during menstruation and the early months of pregnancy. They disappear during the latter half of pregnancy, and during the existence of large intra-abdominal growths.

"The symptoms of movable kidney are due to pressure and traction upon stretching, and irritation of various parts of the solar plexus of the sympathetic and of its branches. The theory of obliteration of the lumen of the duodenum, by pressure or traction, is sufficient to account for the symptom. A movable kidney is the easiest of all intra-abdominal conditions to diagnosticate. The diagnosis is made by palpation of the displaced organ.

"A kidney once movable never again becomes firmly fastened in its normal position, except by operative interference.

"The symptoms due to movable kid-

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ney may be ameliorated by the dorsal decubitus, the Weir Mitchell treatment, massage, electricity, and abdominal supporters. All these measures are, however, in the large majority of cases, disappointing, and the benefit obtained, if any, is likely to prove only transient.

"Nephrectomy, or extirpation of the movable kidney, is too radical and dangerous a resource as compared with nephrorrhapy.

"Nephrorrhapy, properly performed upon properly selected cases, can, as demonstrated by appended histories, be depended upon to afford relief, with a good prospect of the permanency of the latter."

For the most part, our investigations, which include several hundred cases, agree entirely with those of Dr. Edebohls. In one or two points, however, we must disagree. These cases are by no means so hopeless as represented. In the treatment of a large number of cases, now including several hundred, we have never found it necessary to perform a surgical operation, and believe this operation to be justifiable only in cases of floating kidney attended by a considerable amount of pain. In cases of movable kidney, no surgical procedure of any sort is required. The distressing symptoms referred to by Dr. Edebohls may be invariably relieved by other means. The means mentioned by Dr. E. are appropriate, but, in addition, it is highly important to employ others which he does not mention. The most important of these are hydrotherapy and gymnastics. By means of hydrotherapy, particularly the employment of hot fomentations at night over the painful region, followed by the moist abdominal bandage well covered, to be worn during the night, the severe pain from which these patients complain, and also the numerous reflex disturbances growing out of this morbid condition, can be almost invariably relieved. In some instances it is necessary to employ the galvanic or sinusoidal electrical currents, the latter, in particular, I have found useful, employing a current with very rapid alternations,—from five to ten thousand per minute. These means, however, are only palliative. For permanent relief, it is necessary to adopt more thorough-going measures.

We do not quite agree with Dr. Edebohls as regards the cause of movable kidney. It may be true, as he holds, that absorption of the peri-renal fat is the direct cause of the mobility of the organ. But what is the cause of the peri-renal fat? This need not be attributed to some obscure influence affecting the trophic centers or nerves; an efficient cause is found in the faulty methods of dress so common with the women of most civilized countries. Movable kidney is present in fully one third of all the women who have reached adult age and have worn the ordinary dress worn by American women. Why do we not find movable kidney equally frequent in men?—Simply because their dress is not so well calculated to produce this morbid condition. Compression of the waist causes depression of the liver, and in consequence, the right kidney is forced down out of position. In this way only can be explained the fact that the right kidney is so frequently affected in this way, while the left kidney is so seldom found the seat of this morbid condition.

The weak and relaxed condition of the abdominal walls, allowing depression of the viscera and the development of the condition termed by Glenard, enteroptosis, is doubtless a primary cause in the production of movable kidney. This condition is favored by the same faulty habits of dress which give rise to compression of the waist, and thus waist constriction operates in two ways to produce this condition:—

1. By actual dislocation of the kidney; and—

2. By so restricting the movements of

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the abdominal muscles as to render them, in time, weak, flaccid, and unable to sustain the weight of the visceral contents of the abdomen.

In view of these facts, it is evident that the radical cure of movable kidney requires, not simply the employment of massage, abdominal supporters, electricity, fomentations, and other similar measures which have a high value as palliatives, but, in addition, the adoption of such measures as will strengthen the natural supports of the viscera by development of the abdominal muscles. This requires the skillful application of gymnastics, which involves,—

1. A knowledge of the extent of the weakness of the patient, or of his muscular disability; and —

2. An acquaintance with those measures by which the weakness of the special muscles involved may be corrected. Great harm may be done by the employment of exercises too vigorous in character, or such as are not adapted to the patient's condition.

How an accurate knowledge of the patient's condition may be obtained by the employment of a suitable dynamometer, we have shown elsewhere. The best means for strengthening the abdominal viscera is the system of exercise known as Swedish gymnastics. What are known as the manual and the educational exercises should be combined in the treatment of these cases. The sinusoidal current with slow alternations constitutes one of the very best means for passive exercise of the abdominal muscles, and by this means alone great good can be accomplished in overcoming the morbid conditions present.

One other point of great importance should be mentioned, namely, the relation of posture to this condition. It is quite possible that the habitual use of the rocking chair may be properly regarded as a cause of movable kidney. The relaxed condition of the muscles of the trunk when sitting in a rocking chair, and the depression of the sternum occasioned by the posterior curvature of the spine resulting from this relaxed condition, cause a considerable descent of the abdominal viscera. An incorrect position in standing likewise occasions displacement of the kidney.

The correction of a bad posture alone will frequently cause the kidney to rise and to remain in its normal position. The writer has frequently demonstrated this in cases in which the kidney was very distinctly movable. With the patient standing upon her feet, the kidney could be easily grasped between the two hands while the patient was standing in her ordinary attitude, that position which is taken by most women who have worn corsets and tight clothing; namely, with the hips advanced, the shoulders forward, the chest flattened, and the upper portion of the spine with excessive posterior curvature, the head like the hips, abnormally advanced. Making the patient stand in a correct position, with the hips and shoulders well held back, the chest raised forward, the chin drawn in, thus contracting the abdominal muscles vigorously, the kidney will, in a large proportion of cases, be found to ascend at once into its place so that it cannot be felt. But the patient is unable to maintain this position, in consequence of the weak condition of the muscles of the trunk, both anterior and posterior, and consequently in a short time the old position is reassumed, the kidney is again pendant and dragging upon the branches of the abdominal sympathetic nerve, and all the old pain and reflex disturbances return. It is only necessary to develop the muscles of the trunk and to train the patient to maintain constantly a correct posture when not lying in a horizontal plane, to correct the difficulty. This the writer has demonstrated in a great number of cases, and is constantly demonstrating, in connection with his work in the Battle Creek Sanitarium. J. H. K.

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THE DIET OF THE COMING RACE.

WILL the coming race be a beef-, mutton-, and pork-eating race, like the present? is a question which is already interesting a large number of persons. The increasing prevalence of disease among animals commonly used as food among civilized nations, with the fact that the association of these animals with man increases both the number and the frequency of the maladies from which they suffer, is becoming so conspicuous and so alarming a fact that intelligent and thoughtful men and women everywhere are giving the question of the propriety of eating the flesh of lower animals far more attention than formerly.

It is interesting in this connection to recall the fact that all ancient writers who have described the Golden Age to which people of all times have looked back as upon a blissful past, have uniformly referred to this period of peace, prosperity, and happiness as one in which the lives of the lower animals were held sacred, as well as those of human beings, and in which fruits and other products of the earth constituted the exclusive dietary of man as well as of animals of the lower species. Thus Ovid describes Pythagoras as saying: —

"While earth not only can your needs supply,
But, lavish of her store, provides for luxury;
A guiltless feast administers with ease,
And without blood is prodigal to please.
Wild beasts their maws with their slain brethren fill;
And yet not all, for some refuse to kill;
Sheep, goats, and oxen, and the nobler steed,
On browse, and corn, and flowery meadows feed.
Bears, tigers, wolves, the lion's angry brood,
Whom Heaven endued with principles of blood,
He wisely sundered from the rest, to yell
In forest, and in lonely cave to dwell;
Where stronger beasts oppress the weak by night,
And all in prey and purple feasts delight.

"Oh, impious use! to nature's laws opposed,
Where bowels are in other bowels closed;
Where, fattened by their fellows' fat, they thrive:
Maintained by murder and by death, they live.
'T is then for naught that mother earth provides
The stores of all she shows, and all she hides,
If men with fleshy morsels must be fed,
And chaw with bloody teeth the breathing bread;
What else is this but to devour our guests,
And barb'rously renew Cyclopean feasts?
We, by destroying life, our life sustain,
And gorge the ungodly maw with meats obscene.

"Not so the golden age, who fed on fruit,
Nor durst with bloody meals their mouths pollute.
Then birds in airy space might safely move,
And timorous hares on heaths securely rove;
Nor needed fish the guileful hooks to fear,
For all was peaceful; and that peace sincere.
Whoever was the wretch (and cursed be he)
That envied first our food's simplicity,
The essay of bloody feasts on brutes began,
And after forged the sword to murder man —
Had he the sharpened steel alone employed
On beasts of prey that other beasts destroyed,
Or man invaded with their fangs and paws,
This had been justified by nature's laws
And self-defense: but who did feasts begin
Of flesh, he stretched necessity to sin.
To kill man-killers, man has lawful power,
But not the extended license to devour."

It is also of interest to note that many sagacious modern writers, in looking forward to the coming age in which the recognized evils of our present state shall have been by some means gotten rid of, likewise repudiate flesh-eating as inconsistent with a state of universal love and harmony. Bulwer Lytton, in his "The Coming Race," frequently advances the idea that flesh-eating will be abandoned in the coming age; and in one passage to which a friend has recently called our attention, shows clearly his personal views respecting the deteriorating influence of a diet of flesh. Aph'Lin, one of the philosophers of the coming age, is made to explain to a carnivorous visitor the fact that it was unsafe for him to travel unattended, remarking: —

"It would depend upon the individual temperament of some individual sage whether you would be received, as you have been here, hospitably, or whether you would not be at once dissected for scientific purposes. Know that when the Tur first took you to his house, and while you were there put to sleep by Tae in order to recover from your previous pain or fatigue, the sages summoned by the Tur were divided in opinion whether you were a harmless or an obnoxious animal. During your unconscious state your teeth were examined, and they clearly showed that you were not only gramnivorous but carnivorous. Carnivorous an-

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imals of your size are always destroyed, as being of dangerous and savage nature. Our teeth, as you have doubtless observed, are not those of the creatures who devour flesh. It is, indeed, maintained by Zee and other philosophers, that as, in remote ages, the Ana did prey upon living beings of the brute species, their teeth must have been fitted for that purpose. But, even if so, they have been modified by hereditary transmission, and suited to the food on which we now exist; nor are even the barbarians, who adopt the turbulent and ferocious institutions of Giek-Nas, devourers of flesh like beasts of prey.

"In the course of this dispute it was proposed to dissect you; but the Tae begged you off, and the Tur being, by nature, averse to all novel experiments at variance with our custom of sparing life, except where it is clearly proved to be for the good of the community to take it, sent you to me, whose business it is, as the richest man of the State, to afford hospitality to strangers from a distance. It was at my option to decide whether or not you were a stranger whom I could safely admit. Had I declined to receive you, you would have been handed over to the College of Sages, and what might there have befallen you I do not like to conjecture."

Mr. Howells, in his "Altruria," advances a similar thought; and to one who will give the matter serious consideration, it is evident that should the population of the earth continue to increase at the present rate for a few thousand years, the time would come when the habitable portion of the earth would be so densely populated by human beings that it would be necessary to economize food, and land devoted to food production, to such an extent that it would be impossible to depend upon so wasteful a method of nutrition as the use of food at second hand in flesh consumption.

England's Drink Bill.— The London *Times* recently published an article in which the drink bill for England for 1892 is put down at a little more than $700,000,000. The cost of beer and wine was a little less than in 1891, but the expenditure for intoxicating liquors for each family was a little over $90.

REVIEWS.

A Rational Treatment of Prostatic Obstruction in Old Men.— By G. Wiley Broome, M. D., St. Louis, Mo.

Dr. Broome takes issue, in this paper, with Magill and others, with reference to the advisability of prostatectomy. He also opposes systematic catheterism. The systematic use of the catheter invariably gives rise to infection, and so increases the patient's sufferings. Besides, the systematic use of the catheter soon destroys the ability of the bladder to empty itself, and furnishes an efficient means of evacuating the bladder only for a short time, it being impossible to use the catheter in such a way as to completely drain the bladder. Sir Henry Thompson's assertion that habitual catheterism will for two years permanently destroy the power of the bladder to empty itself, is abundantly confirmed by the experience of many surgeons. Dr. Broome's method is based upon the suggestion of Sir Henry Thompson, which aims to relieve these cases by supra-pubic drainage. Dr. Broome's principal improvements consist in opening the bladder at a second operation, by means of puncture with a trocar, and inserting a catheter made self-retaining by a screw thread cut upon it. He claims that in his cases of atrophy of the inflamed prostate, the restoration of the function of the urethra was secured by a few months' rest of the bladder secured by this method.

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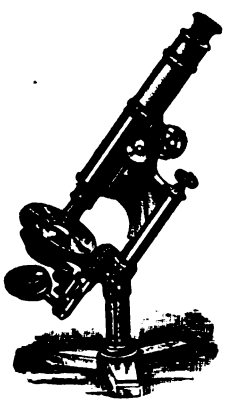

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